

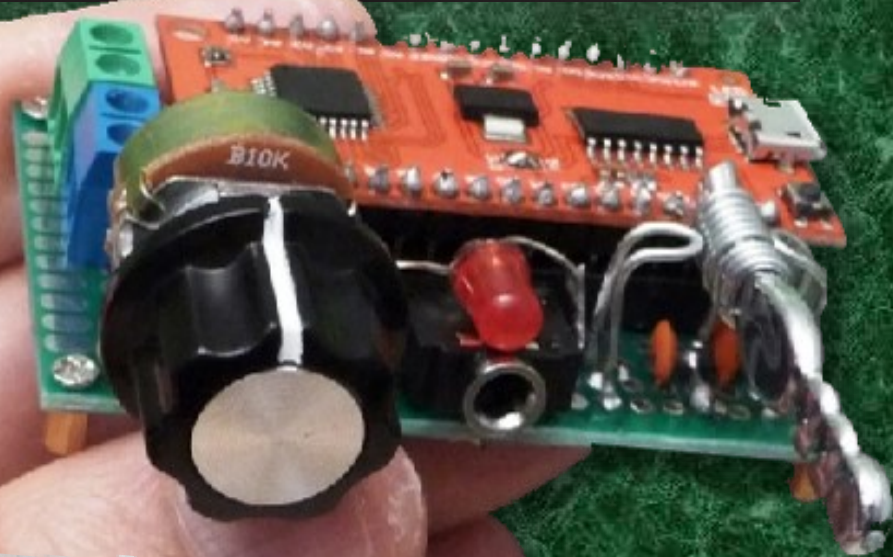
*The*

# ***Communicator***

A Publication Of Surrey Amateur Radio Communications

January  
2019

# **SARC**



All About Arduino Issue!



January 2019



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The **Communicator** is a publication of Surrey Amateur Radio Communications. It appears monthly, except July and August, for area Amateur Radio operators and beyond, to enhance the exchange of information and to promote ham radio activity.

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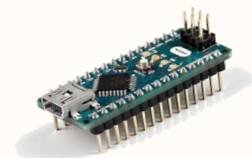
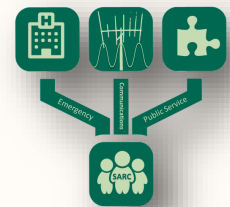
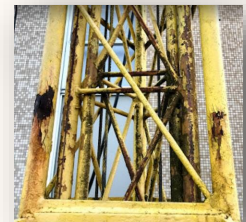
Regular readers who are not SARC members are invited to contribute a \$5 annual [donation](#) towards our Field Day fund via [PayPal](#).

SARC maintains a website at [www.ve7sar.net](http://www.ve7sar.net) and a Digital Communicator at [ve7sar.blogspot.ca](http://ve7sar.blogspot.ca) that includes recent news, past issues of The Communicator, our history, photos, videos and other information.

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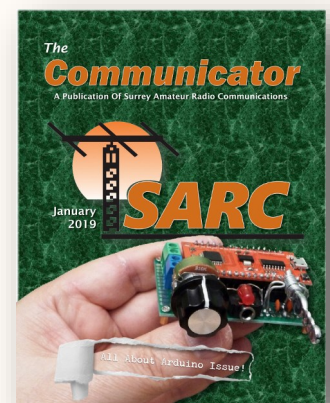
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## On The January Cover...

Here we are in a new year and we have lots in store for you. This issue features projects for Amateur Radio built around the inexpensive Arduino board. There should be something for everyone.

Our best wishes for a healthy and prosperous New Year!





# QRM

---...---

...from the Editor's Shack

*Do you have a photo or bit of SARC news to share?  
An Interesting link?*

*Something to sell or something you are looking for?  
eMail it to [communicator @ ve7sar.net](mailto:communicator@ve7sar.net) for inclusion in this publication.*

Happy New Year!

It's been a busy holiday season for many, starting off with our SARC Christmas lunch on December 8th. Kudos to Jinty VE7JMR for once again organizing a top notch affair which also included our friends from SEPAR and LARA. The photos are at: <https://tinyurl.com/SARC-Xmas18> and elsewhere in this issue.

We also include a year-end collection of photos highlighting the many events and accomplishments from 2018.

In early December we lost another long-time SARC member. Dennis Jackson VE7DGJ became a silent key. Some time ago Dennis was a frequent attendee at the SARC breakfast however, declining health issues made travel increasingly difficult for him. Our condolences to his family.

I had an interesting feedback comment from a non-amateur who wondered why we published a newsletter about hams - confusing us with the edible kind from piggies. Here at the SARC Communicator we would like to serve every reader and potential reader so we publish our first ham recipe this month. You're invited to submit yours.

We had an interesting revelation while hanging a new 40m dipole from our portable tower in mid-December. Two of the tubes on the lowest portion of this collapsible mast have ruptured outward. After some head scratching we think we have found the culprit. More on this in John VA7XB's OTC report.

Looking ahead, our profiled Radio-Active member this month is Kevin VE7ZD. He has recently returned to the hobby and has suggested, and offered, some very interesting presentations and workshops on a variety of subjects. The first will be on January 9th at our General meeting where, in keeping with this Communicator issue focus, he will present an introduction to Arduino.

Daniel VE7LCG, a regular contributor to these pages offers his experiences with Arduino and some basic experimenter projects. My board is on order from eBay!

I'd love to have some interested YL or XYL contribute some newsletter content detailing the contribution the ladies have historically made to this hobby. Is there anyone out there willing to give it a go?

~ John VE7TI  
Communicator Editor

## On the Web

[ve7sar.net](http://ve7sar.net)

Between newsletters, watch your e-mail for news, announcements of Amateur Radio events, monthly meetings and training opportunities.

Click the links below to follow our presence on the web:

**SARC Blog**

[ve7sar.blogspot.ca](http://ve7sar.blogspot.ca)

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**SARC Photo Albums**

**Web Albums**

or

[tinyurl.com/SARCphoto](https://tinyurl.com/SARCphoto)

January 2019



## The Rest Of The Story...

### Alessandro Giuseppe Antonio Anastasio Volta *Early Battery Developer*

*Alessandro Giuseppe Antonio Anastasio Volta (18 February 1745 - 5 March 1827)*

*was an Italian physicist, chemist, and a pioneer of electricity and power, who is credited as the inventor of the electric battery and the discoverer of methane.*

*He invented the Voltaic pile in 1799, and reported the results of his experiments in 1800 in a two-part letter to the President of the Royal Society. With this invention Volta proved that electricity could be generated chemically and debunked the prevalent theory that electricity was generated solely by living beings. Volta's invention sparked a great amount of scientific excitement and led others to conduct similar experiments which eventually led to the development of the field of electrochemistry.*

the University of Pavia for nearly 40 years and was widely idolized by his students.

Despite his professional success, Volta tended to be a person inclined towards domestic life and this was more apparent in his later years. At this time he tended to live secluded from public life and more for the sake of his family until his eventual death in 1827 from a series of illnesses which began in 1823. The SI unit of electric potential is named in his honour as the volt.

#### *Early life and works*

Volta was born in Como, a town in present-day northern Italy, on 18 February 1745. In 1794, Volta married an aristocratic lady also from Como, Teresa Peregrini, with whom he raised three sons: Zanino, Flaminio, and Luigi. His father, Filippo Volta, was of noble lineage. His mother, Donna Maddalena, came from the family of the Inzaghis.

In 1774, he became a professor of physics at the Royal School in Como. A year later, he improved and popularized the electrophorus, a device that produced static electricity. His promotion of it was so extensive that he is often credited with its invention, even though a machine operating on the same principle was described in 1762 by the Swedish experimenter Johan Wilcke. In 1777, he travelled through Switzerland. There he befriended H. B. de Saussure.

In the years between 1776 and 1778, Volta studied the chemistry of gases. He researched and discovered methane after reading a paper by Benjamin Franklin of the United States on "flammable air". In November 1776, he found methane at Lake Maggiore, and by 1778 he managed to isolate methane. He devised experiments



**Alessandro Giuseppe Antonio  
Anastasio Volta**

Alessandro Volta also drew admiration from Napoleon Bonaparte for his invention, and was invited to the Institute of France to demonstrate his invention to the members of the Institute. Volta enjoyed a certain amount of closeness with the Emperor throughout his life and he was conferred numerous honours by him. Alessandro Volta held the chair of experimental physics at



such as the ignition of methane by an electric spark in a closed vessel.

Volta also studied what we now call electrical capacitance, developing separate means to study both electrical potential (V) and charge (Q), and discovering that for a given object, they are proportional. This is called Volta's Law of Capacitance, and it was for this work the unit of electrical potential has been named the volt.

In 1779 he became a professor of experimental physics at the University of Pavia, a chair that he occupied for almost 40 years

### **Volta and Galvani**

Luigi Galvani, an Italian physicist, discovered something he named, "animal electricity" when two different metals were connected in series with a frog's leg and to one another. Volta realised that the frog's leg served as both a conductor of electricity (what we would now call an electrolyte) and as a detector of electricity. He replaced the frog's leg with brine-soaked paper, and detected the flow of electricity by other means familiar to him from his previous studies.

In this way he discovered the electrochemical series, and the law that the electromotive force (emf) of a galvanic cell, consisting of a pair of metal electrodes separated by electrolyte, is the difference between their two electrode potentials (thus, two identical electrodes and a common electrolyte give zero net emf). This may be called Volta's



*Luigi Galvani, Volta's rival*

Law of the electrochemical series.

In 1800, as the result of a professional disagreement over the galvanic response advocated by Galvani, Volta invented the voltaic pile, an early electric battery, which produced a steady electric current. Volta had determined that the most effective pair of dissimilar metals to produce electricity was zinc and copper. Initially he experimented with individual cells in series, each cell being a wine goblet filled with brine into which the two dissimilar electrodes were dipped. The voltaic pile replaced the goblets with cardboard soaked in brine.

### **A voltaic pile**

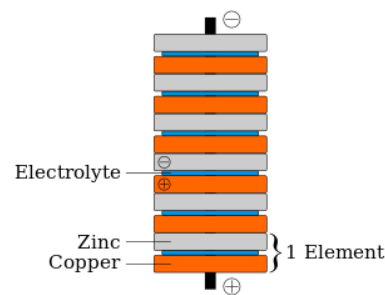
In announcing his discovery of the voltaic pile, Volta paid tribute to the influences of William Nicholson, Tiberius Cavallo, and Abraham Bennet.

The battery made by Volta is credited as one of the first electrochemical cells. It consists of two electrodes: one made of zinc, the other of copper. The electrolyte is either sulfuric acid mixed with water or a form of saltwater brine. The zinc reacts with the negatively charged sulfate. The positively charged hydrogen ions (protons) capture electrons from the copper, forming bubbles of hydrogen gas, H<sub>2</sub>. This makes the zinc rod the negative electrode and the copper rod the positive electrode.

Thus, there are two terminals, and an electric current will flow if they are connected. The copper does not react, but rather it functions as an electrode for the electric current.



*Volta explains the principle of the "electric column" to Napoleon in 1801*



*A Voltaic Pile*

January 2019

However, this cell also has some disadvantages. It is unsafe to handle, since sulfuric acid, even if diluted, can be hazardous. Also, the power of the cell diminishes over time because the hydrogen gas is not released. Instead, it accumulates on the surface of the copper electrode and forms a barrier between the metal and the electrolyte solution.

### **Last years and retirement**

In 1809 Volta became associated member of the Royal Institute of the Netherlands. In honour of his work, Volta was made a count by Napoleon Bonaparte in 1810.

Volta retired in 1819 to his estate in Camnago, a frazione of Como, Italy, now named "Camnago Volta" in his honour. He died there on 5 March 1827, just after his 82nd birthday. Volta's remains were buried in Camnago Volta.

### **Legacy**

Volta's legacy is celebrated by the Tempio Voltiano memorial located in the public gardens by the lake. There is also a museum which has been built in his honour, which exhibits some of the equipment that Volta used to conduct experiments. Nearby stands the Villa Olmo, which houses the Voltian Foundation, an organization promoting scientific activities. Volta carried out his experimental studies and produced his first inventions near Como.

His image was depicted on the Italian 10,000 lira note (1990-1997) along with a sketch of his voltaic pile.

And that is the rest of this story.

~

*The first to seriously study electricity was the British physicist William Gilbert, who is responsible for the paternity of the name "electricity", coined from the ancient Greek elektron, which means "amber"; is rubbing the latter with a cloth that the Greeks had noticed its magnetic properties. Towards the end of the eighteenth century, the young Alessandro Volta, professor of experimental physics at the University of Pavia, was already known for his experiments on electricity that had led him to the invention of the electrophorus, an instrument able to release electricity by rubbing and induction.*

*In the same years the Bolognese doctor Luigi Galvani, with his theories on the presence of electricity in the organic bodies, had risen to the scientific headlines. During an experiment on a frog he realized that the paws of the amphibian contracted even after death, after having touched them with the point of a chisel; from here he had come to theorize the existence of an animal electricity, thesis enthusiastically received by the entire academic world. Except one.*

*Volta was not at all convinced that this was the case and for him that phenomenon was explained by the contact of different metals. The result was a bitter diatribe that split the academic world into two factions, Galvanians and Voltians. The reasons for the latter prevailed, even if the time gave back scientific dignity to Galvani's thesis, today recognized as the discoverer of biological electricity. Volta, on the other hand, drew from the controversy the greatest impulse to continue his research.*

*An article read in the Journal of Natural Philosophy he involuntarily put him on the right track. The author, and his colleague, William Nicholson openly invited him to perfect the electrophorus, starting from the results of recent tests*

*carried out on torpedoes, so-called electrophoric fish (that is able to produce electric fields). The erroneous suggestion was to use a resin and a metal disk, to be rubbed with cat skin.*

*Appreciating the error, Volta drew the right inspiration from that reading, trying to multiply the contacts between different metals. In 1799 he made two wooden columns, stacking inside each pair of different conductive metals, in this case zinc and copper disks separated by layers of felt soaked in a saline solution, so as to produce a continuous electric fluid. The work was completed by a copper wire that put the two ends in contact, circulating and releasing current.*

*It was in fact a first prototype of static electricity generator, a sort of progenitor of what we would now call batteries. The new device, initially referred to as an electromotive device, was shown by Volta in a letter sent to the president of the Royal Society, Joseph Banks, March 20, 1800. That document represented the first official demonstration of the operation of the "stack of Volta" or voltaic pile, as was later identified.*

*The scientific world understood that it was faced with an epochal turning point: for the first time it had at its disposal an instrument able to produce current in an uninterrupted way, effectively opening up to the era of electricity and to formidable technical repercussions. During the century this was the starting point for many discoveries, including the electric telegraph, the light bulb, the radio.*

*The fame of Volta soon crossed national and European borders and among the acknowledgments obtained the history of the stack in the presence of Napoleon Bonaparte entered the story, which fascinated him to such an extent that he offered him the Legion of Honor and a conspicuous prize in money.*





## Back to Basics

John Schouten VE7TI

### *From The Canadian Basic Question Bank*

*This month, in an ode to Mr. Volta, we'll look at Voltage and specifically batteries.*

**B-003-016-001**

**How much voltage does a standard automobile battery usually supply?**

1. About 12 volts
2. About 240 volts
3. About 120 volts
4. About 9 volts

#### **Voltage**

Voltage, electromotive force (EMF) electric potential difference, electric pressure or electric tension is the difference in electric potential between two points.

Electric potential differences between points can be caused by electric charge, by electric current through a magnetic field, by time-varying magnetic fields, or some combination of these three. A voltmeter can be used to measure the voltage (or potential difference) between two points in a system; often a common reference potential such as the ground of the system is used as one of these points. A voltage may represent either a source of energy (electromotive force) or lost, used energy (a potential drop).

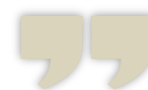
A simple analogy for an electric circuit is water flowing in a closed circuit of

pipework, driven by a mechanical pump. This can be called a "water circuit".

Potential difference between two points corresponds to the pressure difference between two points. If the pump creates a pressure difference between two points, then water flowing from one point to the other will be able to do work, such as driving a turbine.

Similarly, work can be done by an electric current driven by the potential difference provided by a battery. For example, the voltage provided by a sufficiently-charged automobile battery can "push" a large current through the windings of an automobile's starter motor. If the pump isn't working, it produces no pressure difference, and the turbine will not rotate. Likewise, if the automobile's battery is very weak or "dead" (or "flat"), then it will not turn the starter motor.

The hydraulic analogy is a useful way of understanding many electrical concepts. In such a system, the work done to move water is equal to the pressure multiplied by the volume of water moved. Similarly, in an electrical circuit, the work done to move electrons or other charge-carriers is equal to "electrical pressure" multiplied by the quantity of electrical charges moved. In relation to "flow", the larger the "pressure difference" between two points (potential difference or water pressure difference), the greater the flow between them (electric current or water flow).



*A simple analogy for an electric circuit is water flowing in a closed circuit of pipework...*

*Yes, you too **can** pass the Basic exam!*



## Batteries

Batteries are a collection of cells producing a direct current (DC) voltage, meaning that electrons flow in only one direction as opposed to alternating current (AC) where electrons oscillate back and forth. All batteries have a positive (+) terminal frequently colour coded red, and a negative (-) terminal colour coded black. The chemistry of the cells will determine the voltage. For example, the under-the-hood battery used in most automobiles is a **12 volt** (nominal) lead acid battery that comprises six 2-volt cells in a single package using a sulphuric-acid/water solution and lead plates. The actual cell voltage depends on the state of charge, ranging from about 1.85 Volts (discharged) to 2.2 Volts (fully charged). So a fully charged car battery may actually measure just over 13 Volts.

### Primary Cell

Primary batteries, or primary cells, can produce current immediately on assembly. These are most commonly used in portable devices that have low current drain, are used only intermittently, or are used well away from an alternative power source, typically a flashlight or portable radio. Primary cells cannot be reliably recharged, since the chemical reactions are not easily reversible and active materials may not return to their original forms. Disposable batteries do not fare well under high-drain applications with loads under 75 ohms ( $75 \Omega$ ). Common types of disposable batteries include zinc-carbon batteries and alkaline batteries.

### Secondary Cell

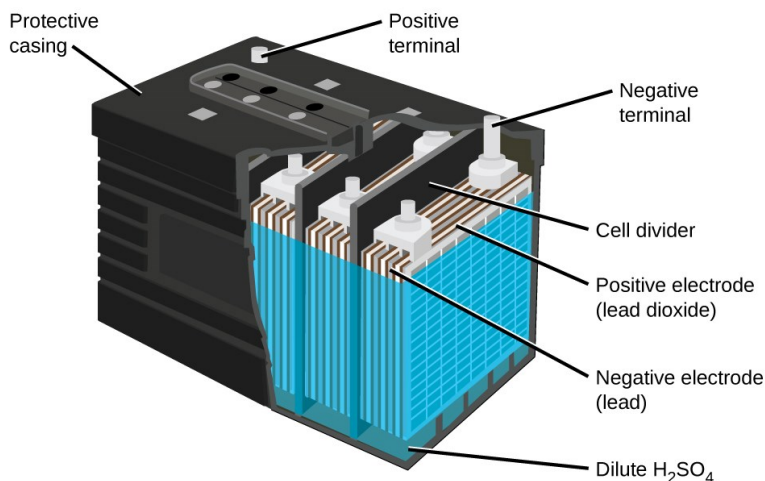
Secondary batteries, also known as secondary cells, or rechargeable batteries, must be charged before first use; they are usually assembled with active materials in the discharged state. Rechargeable batteries are (re)charged by applying electric current, which reverses the chemical reactions that occur during discharge/use. Devices to supply the appropriate current are called chargers.

The oldest form of rechargeable battery is the lead-acid battery, which are widely used in automotive and boating applications. This technology contains liquid electrolyte in an unsealed container, requiring that the battery be kept upright and the area be well ventilated to ensure safe dispersal of the hydrogen gas it produces during overcharging. The lead-acid battery is relatively heavy for the amount of electrical energy it can supply. Many other types of electrochemical cells have been produced, with varying chemical processes and designs. There include lithium-ion and zinc-manganese dioxide.

### Lead-Acid Batteries

The lead-acid battery, a fore-runner of modern automotive batteries, was invented in 1859 by French physicist Gaston Planté. Despite having a very low energy-to-weight ratio and a low energy-to-volume ratio, its ability to supply high surge currents means that the cells have a relatively large power-to-weight ratio. These features, along with their low cost, make them attractive for use in motor vehicles to provide the high current required by automobile starter motors. The modern car battery can, in general, deliver a peak current of 450 amperes.

As they are inexpensive compared to newer technologies, lead-acid batteries are widely used even when surge current is not important and other designs could provide higher energy densities. In 1999 lead-acid battery sales accounted for 40-45% of the value from batteries sold worldwide excluding China and Russia, and a manufacturing market value of about \$15 billion. Large-format lead-acid designs are widely used for storage in backup power supplies in cell phone towers, high-availability settings like hospitals, and stand-alone power systems. For these roles,





modified versions of the standard cell may be used to improve storage times and reduce maintenance requirements. Gel-cells and absorbed glass-mat batteries are common in these roles, collectively known as VRLA (valve-regulated lead-acid) batteries.

Because the electrolyte takes part in the charge-discharge reaction, the lead-acid battery has one major advantage over other chemistries. It is relatively simple to determine the state of charge by merely measuring the specific gravity of the electrolyte; the specific gravity falls as the battery discharges. Some battery designs include a simple hydrometer using colored floating balls of differing density. When used in diesel-electric submarines, the specific gravity was regularly measured and written on a blackboard in the control room to indicate how much longer the boat could remain submerged.

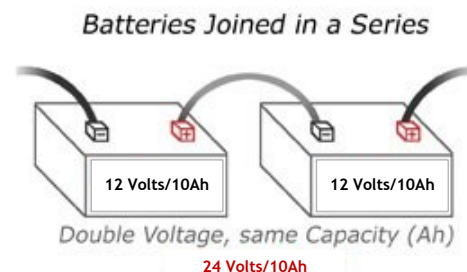
The battery's open-circuit voltage can also be used to gauge the state of charge. If the connections to the individual cells are accessible, then the state of charge of each cell can be determined which can provide a guide as to the state of health of the battery as a whole, otherwise the overall battery voltage may be assessed.

Note that neither technique gives any indication of charge capacity, only charge level. Charge capacity of any rechargeable battery will decline with age and usage, meaning that it may no longer be fit for the intended purpose even when nominally fully charged. Other tests, usually involving current drain, are used to determine the residual charge capacity of a battery.

Again, a lead-acid battery's theoretical voltage is 2 V for each cell. For a single cell, the voltage can range from 1.8 V loaded at full discharge, to 2.10 V in an open circuit at full charge. Float voltage varies depending on battery type, i.e. flooded cells, gelled electrolyte, absorbed glass mat (AGM), and ranges from 1.8 V to 2.27 V.

### Series Batteries

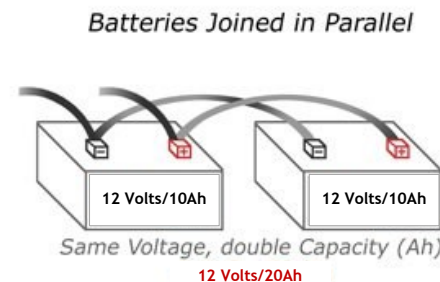
When connecting batteries in series (end-to-end) you are doubling the voltage while maintaining the same capacity rating (amp hours). Just use a jumper wire between the negative of the first battery and the positive of the second battery. Run your negative wire off of the open connector from the first battery and your positive off of the open connector on your second battery.



### Parallel Batteries

When connecting batteries in parallel, you are doubling the capacity (amp hours) of the battery while maintaining the voltage of one of the individual batteries.

This would be used in applications such as laptop batteries, some scooters, some UPS backups, etc. Use a jumper wire between the positives of both batteries and another jumper wire between the negatives of both batteries. Connect your positive and negative wires to the same battery to run to your application.



Our sample question this month asked:

#### **How much voltage does a standard automobile battery usually supply?**

We now know that it is a secondary cell, a lead-acid battery made up of several cells wired internally in series, with each cell capable of delivering about 2 Volts. Cars typically have a 12 volt battery.

Therefore the answer to our sample question is:

1. **About 12 volts**

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| • Use satellite communication to speak around the world, perhaps even to an astronaut | • Use a computer, smartphone or tablet for free worldwide digital communications |
| • Participate in 'Radio Sports' like contesting and Fox Hunting                       | • Practice an exciting hobby   |

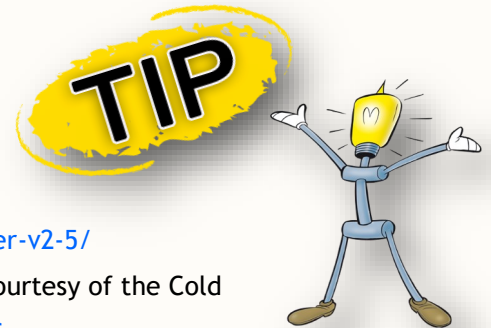
## Study Links

Whether you are new to the hobby or brushing up on skills, you should find these study links helpful:

1. RIC-7 is the entire up-to-date Industry Canada (IC) Basic Question Bank.  
<http://tinyurl.com/CanadaBasicQB>
2. There is a RIC-7 that has some explanations along with the questions.  
[RIC-7 2014rev08.05 with explanations.](#)
3. The Amateur Radio Exam Generator is at:  
[https://www.ic.gc.ca/eic/site/025.nsf/eng/h\\_00040.html](https://www.ic.gc.ca/eic/site/025.nsf/eng/h_00040.html)
4. The ExHaminer Study software for Windows is at: <https://wp.rac.ca/exhaminer-v2-5/>
5. There are plenty of good resources for both basic and advanced exam study courtesy of the Cold Lake Amateur Radio Society at: <http://www.clares.ca/va6hal%20training.html>

Contact SARC if you wish to write the Basic or Advanced Exam. If you pass we'll even give you a year's free SARC membership!

**Newly Licensed?** When you receive your paper license in the mail, it will come with a form that can be filled out and mailed to the Radio Amateurs of Canada office, at which point an introductory RAC one-year membership will be set up. Introductory memberships are identical to our existing basic memberships and you will receive the The Canadian Amateur magazine for one year.





## Wire Snippets

A video on The Hidden Meaning of Ham Radio Jargon: a ten-minute, entertaining lecture on “hamspeak” that you can use to impress (or fool) your friends:

[https://www.youtube.com/watch?v=dA2N367qt\\_A&feature=youtu.be](https://www.youtube.com/watch?v=dA2N367qt_A&feature=youtu.be)

Take a look at this post from 2005: [Some Amateur Radio Statistics](#) and this one from 2015: [Ten Year Trends in US Ham Licenses](#).

Here is an excellent video on how an oscilloscope works and how to use one:

<https://youtu.be/2f4ghMr6Ybs>

Next month we will have a closer look at the newest digital mode FT8. There are some amazing stories about this mode and its amazing ability to complete a contact where the signal cannot even be distinguished from the background noise. Kevin VE7ZD made 2 FT8 QSOs, Alaska and Arizona, in under ten minutes from a hotel room in Portland using a 25' hunk of wire strung indoor from the lampshade to a curtain rod using 3 watts on 20m. He already has 36 states confirmed in a week, and a bit of DX too (Japan, South Korea) but he is concentrating on WAS to see how quickly he can do it on FT8.

In anticipation of this topic, you may want to do some pre-reading, and a revised "Quick-Start Guide to WSJT-X 2.0" for RC5 is posted here:

[https://physics.princeton.edu/pulsar/k1jt/Quick\\_Start\\_WSJT-X\\_2.0.pdf](https://physics.princeton.edu/pulsar/k1jt/Quick_Start_WSJT-X_2.0.pdf)

January 2019

# January 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
30	31	1 1930 SEPAR Net 2000 SARC Net	2	3	4	5 08-1000 SARC Social: Kalmar Family Restaurant King George Blvd & 81st Avenue  CONTEST: ARRL RTTY Roundup
6 CONTEST: ARRL RTTY Roundup	7	8 1930 SEPAR Net 2000 SARC Net	9 1900 SARC General Meeting	10	11	12 08-1000 SARC Social: Kalmar Family Restaurant  CONTEST: North American QSO Party (CW)
13 CONTEST: North American QSO Party (CW)	14	15 1930 SEPAR Net 2000 SARC Net	16	17	18	19 08-1000 SARC Social: Kalmar Family Restaurant  CONTEST: North American QSO Party (SSB)
20 CONTEST: North American QSO Party (SSB)	21	22 1930 SEPAR Net 2000 SARC Net	23 1900 SARC Exec Meeting	24	25	26 08-1000 SARC Social: Kalmar Family Restaurant  CONTEST: BARTG RTTY Sprint
27 CONTEST: BARTG RTTY Sprint	28	29 1930 SEPAR Net 2000 SARC Net	30	31	<div> <p>For details on all SARC events, go to <a href="http://ve7sar.net">ve7sar.net</a></p> <p>For details on all SEPARS events, go to <a href="http://separ.shutterfly.com/calendar">separ.shutterfly.com/calendar</a></p> </div>	

Contest Details: <http://hornucopia.com/contestcal/contestcal.html>





## Page 13—News You Can Lose

The Lighter Side of Amateur Radio

***Patty Loveless KD4WUJ***

Born in 1957, in the state of Kentucky. She was described as a down-home girl finding her American dream! Patti was born Patricia Lee Ramey but she was married to Terry Loveless from 1976 to 1986, and from whom she derived her professional name.

Her father would give her a guitar at age eleven and she became one of the most popular female artists ever to hit the Grand Ole Opry stage and the air waves. Patty would begin writing and singing songs with her older brother Roger before she was age twelve. At the age of 14, she had written an impressive amount of original songs and Roger would take her to Nashville. Meeting Porter Wagoner, who would become a close friend and mentor, was instrumental getting Patty into the Opry's front door.

With a recording contract, Loveless headed into the recording studio to record new material for Epic Records. In the studio, her producer noticed that her voice was not as strong as it had been when she last recorded two years previously. Loveless felt some pain in her throat when singing, and when she saw a physician, he noticed a red spot on her vocal cords. By 1992, Loveless was on a regimen of steroid tablets and cortisone to prop up her voice.

Despite the voice problem, Loveless had booked an autumn 1992 tour. Additionally, she had been invited to appear on a CBS television special *Women In Country*. The day before leaving on the tour, Loveless asked her manager to accompany her to her throat doctor's office. In the office, her doctor compared her 1990 results versus what he saw during the exam. Her vocal cords had developed an enlarged blood vessel that looked like a varicose vein. The juxtaposition was dramatic, and furthermore, if not treated, it could end her career and there was no guarantee that surgery could correct the problem.

Although Loveless went ahead and sang in the television special, her manager canceled all of her tour dates for the remainder of 1992. On October 21, Loveless had corrective throat surgery. For the next nine weeks, she could neither sing nor talk. Her husband, in order to communicate with her, attempted to teach her Morse code, as well as using pen and paper with yellow Post-It notes. After this, her interest in Amateur Radio developed and she was eventually licensed with the callsign KD4WUJ. Both Patty and her husband are hams.



January 2019



## At The Last SARC Meeting

December Christmas Lunch

*Saturday, December 8, 2018*



*Thanks Jinty, it was  
a grand affair!*





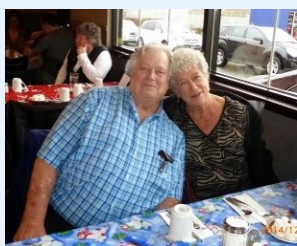


*More photos?*

<https://tinyurl.com/SARC-Xmas18>



## ***Remembering Dennis Jackson VE7DGJ SK***



We bid farewell to Dennis Jackson VE7DGJ who became a silent key. Until some time ago Dennis was a frequent attendee at the SARC breakfast however, declining health issues made travel increasingly difficult for him. Our condolences to his family.





January 2019

## Operations & Training Centre News

John Brodie VA7XB

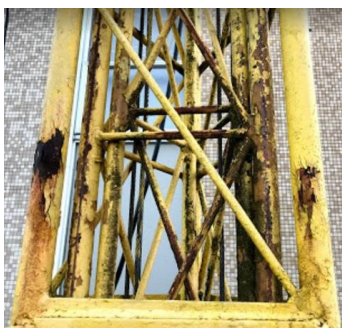
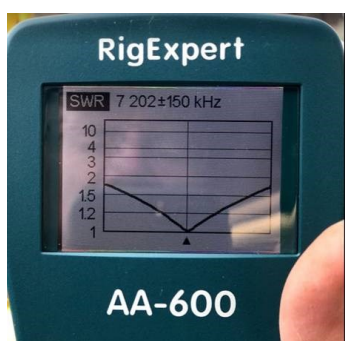
### Problems and Solutions



We now have two low band antennas: the time-tested off-centre-fed (OCF) multi-band dipole, which now serves us mainly for 80 m, plus the newly erected 40m inverted vee, the latter thanks to the willing crew (Robert VA7FMR, Michael VE7GMP, John VE7TI and John VA7XB) who came out on Saturday Dec. 15, despite cold and windy (but not wet,

thank goodness) weather. Tower climbing duties were ably performed by Michael.

The antenna had been cut to the low end of 40 m, but after erection the point of minimum swr was adjusted to 7.200 MHz by shortening each leg by around 6 inches. The swr is now below 3.0 at both ends of the band when the tower is erected to its full height.



Drilled hole & black water draining out below

weld

Each leg of the vee is about 33 ft long, connected to a 3 kw 1:1 balun at the apex and to a C-clamp at the roof level. Other photos of the day's activities can be viewed at:

<https://photos.app.goo.gl/qpkdLdJWswHqEEZ49>

One significant problem was identified: As first noticed by Michael, small tears were observed on 2 of the 3 bottom legs of the tower, where the metal has split. Freezing of water trapped in the leg above the weld has been confirmed as the cause because small drain holes drilled below the split produced water, which was present above the pipe welds. David Scoular VE7MON, a colleague of Robert VA7FMR, has inspected and kindly offered to conduct the repair. *[He did so on December 23, see the photo next page—Ed.]*

This photo also illustrates that the tower is not in good condition, and serious consideration will have to be given to sandblasting and painting in the near future.

The decision was made to add guy ropes to the lower tower section to stabilize it against leaning and wind movement. While 2 of the 3 guy ropes will be attached to the existing concrete barriers, the City agreed to allow us to pour a shallow block of concrete at the west side adjacent to the building to attach the third rope. This work was carried out by Michael VE7GMP and John VA7XB, providing a further degree of comfort against failure when the tower is raised to full height. At the same time, the open legs of the lower section of tower were sealed against entry of water by driving in rubber bungs.

Another, but minor, problem: The beam direction was found to be 50 degrees greater than the azimuth shown on the controller; this was easily corrected by calibration of the controller but it suggests that we have had slippage, probably under the influence of wind, as the alignment was correct at the time the rotator was installed. Rotator bolts were checked and tightened, and found to be tight; neither was there movement in the fixed pipe below the rotator. We will have to keep an eye on this. Does this rotator have a clutch?



On Sunday Dec. 16th, members of the OTC

committee met together for the second time this year to consider spending priorities, following receipt of our successful gaming grant. Because the largest single item on our wish list was more costly than the amount of the grant, an earlier decision was to drop the linear amplifier from the list. Remaining priorities were then ranked and the following purchase decisions were agreed upon, subject to further research:

1. A 3kw gasoline generator, to provide emergency power to the UPS which in turn powers the 12v DC system at the OTC.
2. High power triplexer and bandpass filters to be constructed for to provide multi-transmitter capability on 10-80 m
3. A mic-headset for use with the IC-7610
4. One or more Arrow antennas for satellite contacts
5. Various requirements of the Public Service Group - more on this in future reports

~ 73, John VA7XB





January 2019



# Radio Active

Robert Fishwick VA7FMR

## Profiles of SARC Members



**Kevin McQuiggin,  
VE7ZD/K7MCQ**

*Ask Kevin sometime about  
his lemon battery and low  
power contact*



Kevin was born in Ontario in 1960, but moved around a lot as a kid due to his father's work in the broadcasting field. His father worked for CBC and in those days they moved staff around the country a lot. Kevin and family ended up in BC in 1975, where he finished high school, got his ham license (VE7CPT) in the summer of 1977 and started Computing Science and Math at SFU that fall.

He graduated from SFU in Computing Science in 1983. He would have been finished in 1981 but he joined the Vancouver Police Department in that year and left his final course for graduation until a couple of years later. He worked in policing for many years in many interesting roles, but got back to graduate school (again at SFU) around 1994 when he got involved in a high speed packet radio project sponsored by the School of Communication. It was the first 56K packet network in Canada, and operated on 70 cm with repeaters on Mt. Seymour and Sumas Mountain near Chilliwack. The network worked really well, but unfortunately there was little uptake in the local ham community as the project depended on complicated hardware that was very advanced for its day.

Kevin's graduate studies led to a Masters' degree in Communication. His topic was "Amateur Radio and Innovation in Telecommunication Technology". He spent 4 years looking at the history of ham radio and how many of our commercial technologies had their start with hams and on ham bands. Hams innovate and create in a manner very different from the way industry does and this can result in some really creative new ideas.

*[Kevin's thesis is available at:  
<https://goo.gl/Pn94qr> -Ed.]*

Kevin was the first ham in his family. Although his father had always been very interested in the technical side of radio (in addition to being a broadcaster), he grew up very poor in the Depression and never had the opportunity to get his own ticket. He did teach Kevin Morse Code though, when he was about 13, with a code practice oscillator they built together. He had a great "fist" and could send/receive at easily up to 25 WPM. Kevin loved practicing with his father and he thinks this is where he got his love of CW from. He spent years on CW contesting etc when he was a late teenager and young adult.

Kevin has broad interests and a varied work history. He retired from the Vancouver Police Department as an Inspector in 2011. He is also a commercial pilot and flight instructor and flew big jets (Boeing 727 and the McDonnell-Douglas DC10) for a couple of years at a cargo airline after he retired from VPD.

He is currently employed as:

1. an instructor at the Justice Institute of BC, where he teaches programs for the BC Police Academy;
2. a consultant for a small firm that does policing reviews. He does the technical stuff, dispatch and records systems, and police/public safety radio systems. They work all over Canada;
3. an entrepreneur, where he develops hardware/firmware/software for custom-designed wireless devices. He developed a little wireless device for bagpipers and it is being sold internationally;



4. various other capacities at SFU, BCIT, various research agencies.

Kevin and his wife Laura, VE7LPM collect old broadcast receivers from the 1920s-1940s, and they restore them to working order. They currently have about 70 radios. He has lots of restoration work to do when he finally finishes formal work.

He also collects old minicomputers from the seventies (think refrigerator-sized units with toggle switches and blinking lights on the front, that was "mini" in the 1970s!) and he has about 20 systems in his basement. The machines generally run, but a few of them need some work, which like the radios, he will get to eventually. For those readers who want to travel down memory lane, Kevin's machines include several pdp-8s, pdp-11s, a few VAXes, and a single old Sun workstation. He has no interest in early "PCs", they are WAY too new!

Kevin became VE7ZD in the late 80s. He also holds a US ticket, K7MCQ.

He is just getting back into amateur radio after likely a 20-year absence. He bought an Elecraft KX3 and is running it to an 85' long wire antenna in his backyard. He sold his kilowatt amps, big tower and TH6 years ago. He used to have a bit of an antenna farm and was active on satellites, VHF/UHF, ATV, even two metre EME. He was a keen contester in the late 1970s and early 80s.

He has done lots of work in DSP and SDR development and is interested in building his own receivers (and some transmitters) using the fantastic gnuradio open source package. SDR is where our hobby is going, and it is exemplified by new rigs such as those from Flex and Elecraft.

Kevin has written several interesting receivers in gnuradio, and is looking forward to developing more. One of the most interesting projects was a decoder for the commercial Inmarsat's telemetry/control channels around 1.5 GHz. It receives a complex channel from the satellite and decodes it. Kevin saw a great presentation on passive radar at the last gnuradio conference this past fall and wants to develop his own system from scratch. This will be his next gnuradio project.

Kevin is also interested in trying to monitor NASA and other space probes directly. There is a group of hams in Europe who regularly monitor the space probes at Mars and beyond \*directly\*. Very cool! Check out the "Amateur DSN (Deep Space Network) Group".

Kevin has his old Yaesu FT-101Z with external VFO for sale - He hopes someone in the club can take it off his hands!!! It works well and is in top cosmetic shape.

As noted above, Kevin has a KX3 currently, plus some handhelds. He has an Ettus B200 DSP radio and uses it for gnuradio experimentation. It can both transmit and receive to 6 GHz. In addition to the above, he has an old Hammarlund XQ-140 in his shack and an old general coverage receiver from the late 1950s. It works well and looks great!

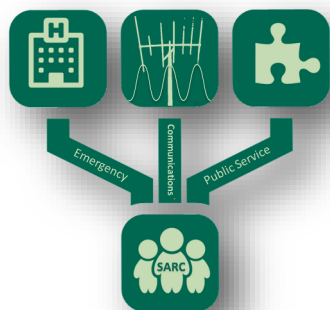
Kevin is interested in digital, primarily (e.g. FT8 and similar modes) as they work so well in poor propagation conditions. Satellite channels face similar challenges and use the same types of encoding as all these new modes do. FT8 and these other new digital modes just take these techniques and apply them to terrestrial low power communication. Of course CW remains an interest, and SSB is fun, and he is a former contester. He feels we need some propagation first though!

When he was getting back into the hobby, he looked for active clubs with progressive programs and members, good community service and an atmosphere of fun: SARC stood out. He also knows John VE7TI from their careers in the Vancouver Police Department. They overlapped on a lot of projects there, including E-Comm.

Welcome back Kevin, we're pleased that you joined SARC!

~ 73 Robert VA7FMR





## The Public Service Report

Amateur Radio Serving The City Of Surrey

### *Public Service Principles*

**Don Hamilton VA7GL**

The Amateur Radio Public Service main thesis is to continually learn how to use your skills and license in serving your community. SARC will facilitate membership participation in community events by starting and structuring programs focused on serving the City of Surrey and civic minded organizations with the use of SARC member's ham radio skills, equipment and knowledge.

The executive is examining various global service models to best serve the City of Surrey. The city's emergency communications equipment and operations have changed significantly since 2010, the era of SEPAR, as most governmental equipment has been "hardened" to just about eliminate catastrophic failure, which greatly reduces the need for ham radio to enable the Mayor to talk to the Fire Chief.

"Public Service" is now enhanced to include the whole community during both "fun" and "emergency" activities, and offering communications to other volunteer groups that cannot afford the "hardening" previously mentioned. Some examples coming to mind are: Red Cross, Salvation Army, St. John's Ambulance, public service groups that sponsor parades, auto rallies, Bike-A-Thons and such. SARC will now engage with our community in community events, which are the "fun" part of being a Ham in Surrey while raising our profile. Public Service event volunteers will now have far more scope to interact with City programs. Therefore, the best role for SARC members is supporting our

community by using our ham radio skills and equipment, in Public Service.

#### ***What's the Plan?***

First answer: The plan is to "Build a Plan!" and "Build a PS SIG" (Public Service Special Interest Group). The executive and membership have given a general Go-Ahead, to start SARC participating in public events, without specific guidance. Further a portion of the Gaming Grant money has been allotted to this SIG; also, liaison with OTC planning should permit efficient merging of facilities, contesting, and public service. We will start a core group of SARC members to suggest policy and equipment purchases.

#### ***How's this going to Happen?***

Create a centre in the OTC that is dedicated to Public Service. First create a home, rearrange one of the rooms in the OTC to facilitate Public Service support and Communication. Then, carefully evaluate where we are and set some short-term achievable goals. We will introduce training and start programs over the next couple of months; the target is to find what's really required. We'll need to learn the ever-changing role of ham radio's public service support.

#### ***Programs we could include***

Using "Winlink" to digitally communicate; Winlink is a software program that allows you to access a worldwide radio email service that uses

radio pathways when the Internet is not also present. Notably, it is capable of operating completely without the internet--automatically--using smart-network radio relays. Winlink provides its users email with attachments, position reporting, weather and information bulletins, and is well known for its role in emergency and disaster relief communications

APRS, Automatic Packet Reporting System (APRS), which allows packet radio to track real-time events. It deviates markedly from the usual message - and text-transfer activity. Instead, APRS concentrates on the graphic display of station and object locations and movements. The OTC Operations Centre can now see where the volunteers are located, to ensure the safety and effectiveness of the Communications teams.

The goal is to have the space useable sometime in January/February. Then we can see what we've got to work on next. Hopefully we will be able to check into some of the emergency program nets from the OTC facilities.

~ Don VA7GL



### Roger Andrews VA7VH

The RMS Gateway for Winlink is up and running. It's temporarily at my home so some areas of the city might not be able to reach it. The frequency is what it's always been: 145.070+ and the callsign is VE7MOV-10. It is running on Linux, on one of the Panasonic Toughbooks. It is not using a hardware TNC any longer and uses only the Direwolf virtual software TNC. The only hardware other than the computer, is a small device I built to isolate the PTT control from the computers serial port. Jim - VE7HUR has been connecting to it regularly and other than during the power outage when Shaw cable went out (I was on a generator so had power, but Shaw couldn't keep their equipment up) it has worked flawlessly.

Unfortunately, after setting it all up, I realized that RMS Gateway for Linux does not have a built in RMS Relay. That means that if the internet goes down, there is no "store and forwarding" of messages. That's not good for an emergency communications provider, so I've started configuring LinBPQ with a BBS that will also act as a "store and forward" facility. LinBPQ is much more

Name	Frequency	Offset	CTCSS
VE7RSC (Primary Repeater)	147.360	+0.600	110.9
VE7RSC (Secondary Repeater)	443.775	+5.0	110.9
VE7RPT (Primary Regional Repeater)	146.940	-0.600	
	Optional 136.5	Rcve	
Simplex 1	(VHF)	146.550	
Simplex 2	(VHF)	147.420	
Simplex 3	(UHF)	446.550	
Simplex 4	(UHF)	447.425	

#### Other frequencies in the Greater Vancouver area:

Primary: Coquitlam/Abbotsford	146.430
Primary: Inter-Municipal Group 3	146.445
Primary: Vancouver; Mission; Sec. Coquitlam	146.460
Primary: Kent-Mission; Sec. Richmond	146.475
Primary: Inter-Municipal Group 2	146.490
Primary: New West; Sec. Richmond	146.505
National Calling / FM Simplex Group I	146.520
Primary: North Shore; Port Coquitlam	146.535
Primary: Bowen Island; Surrey	146.550
Intermunicipal Group 1 Coordination	146.565
Primary: Lions Bay/Vancouver/Delta/Langley	146.580
Primary: Port Moody; Sec: Burnaby	146.595
Secondary: Vancouver/Surrey	147.420
Secondary: Vancouver (UBC) / Maple Ridge	147.450
Primary: White Rock/Chilliwack; Sec. No. Shore	147.480
Secondary: Burnaby/Pitt Meadows	147.510
Primary: Delta; Sec: Abbotsford	147.540
Primary: Hope; Sec: Delta; ALSO EMBC	147.570

complex and has a massive feature set. It will take me a little while to figure out all the config settings I need but once done we'll have a far better gateway. The BBS feature will be a nice touch, giving SEPAR members a place to exchange information and use their radios in the process. I'll send out a bulletin once it's up for testing.



January 2019

## SEPAR Annual Competition

As of last April, we started a competition that active SEPAR members can participate in. The most active member will win an MD390 DMR Radio package. You can checkout pictures of the radio and see the rules on <http://va7.ca/radio> (an interim website).

If you are not now a member, we'd love to have you on-board. Contact me at the link above.

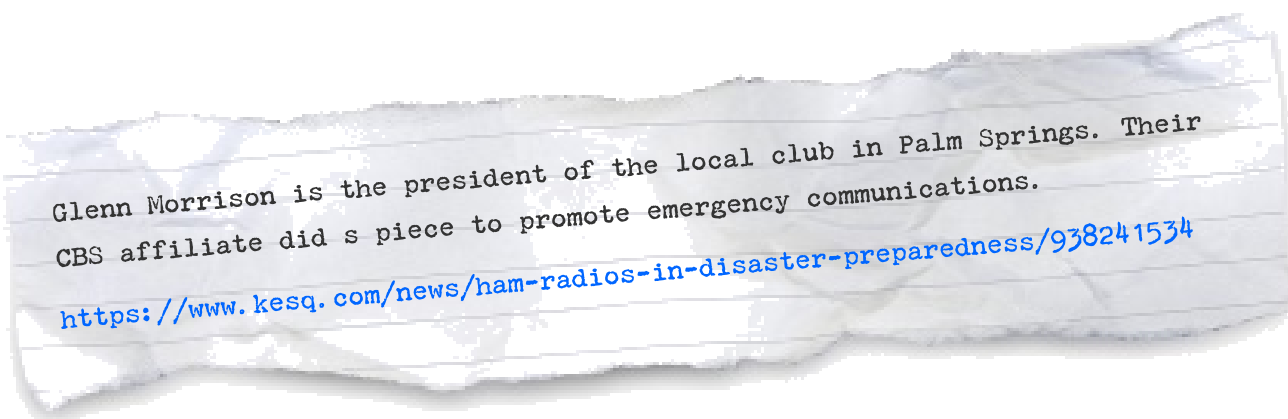
### Weekly Nets

Every Tuesday evening at 1930 hrs (7:30pm PDT) we start a ½ hour NET on a local repeater provided by the Surrey Amateur Radio Communications (SARC) on 147.360 MHz +600kHz and a tone of 110.9. There November be a simplex test or a test NTS message transmitted during the NET at the Net controllers discretion. This is an excellent opportunity to practice sending and receiving this form of messaging. Besides, it adds a little spice to the regular check-ins on the net.

Please join us. NTS Radiograms can be found on the SEPAR website here, or, if you would like a fillable PDF that you can enter on your computer, you can get it from here.

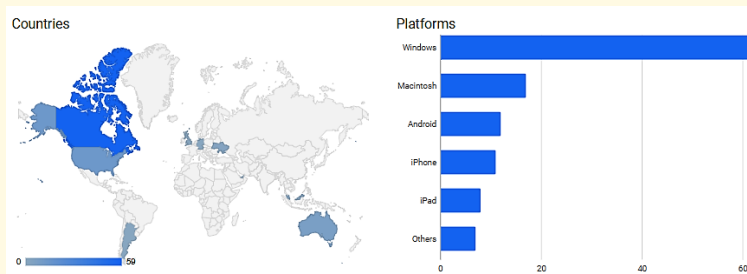
Thursday nights at 19:30 hours, This Net has changed! We are no longer doing a regular 2 meter simplex Net on this night. Any plans for Thursday night will be announced on the Tuesday before. This night will now be used for optional tests. For example NTS Digital exchanges, 6 meter, 2 meter 60 cm and 220 Nets. If someone wants to do a particular net on a Thursday, then please announce it on the Tuesday before.

~ Roger VA7VH  
SEPAR Coordinator



## A Postscript...

Here is a data extract from our blog site: <https://ve7sar.blogspot.ca>. As you can see, we receive a bit of anonymous data about visitors to our site, primarily location. Several times in the past year that the blog has been active we have received visits from every continent except Antarctica. Last month was particularly busy as we exceeded 3,500 individual visits. Thanks for your visit... and Antarctica, where are you?





# SOLDER SPLATTER

Steve McDonald, VE7SL

## Building Circuits 'Muppet' Style

*I haven't yet decided to rebuild the little 630m CW transmitter using Manhattan style or the newer Muppet style being promoted by Chuck, K7QO.*

### K7QO Muppet Style

The Muppet style seems to be PCB without holes, with parts being mounted on the copper pads directly. Like Manhattan or Ugly construction, changing components is very convenient. I pretty much split final construction methods between Manhattan style or dedicated PCB.

I recently ran low on the pads used for Manhattan and made another pile of various sizes. For those interested in using this style, it's pretty quick and easy to manufacture a good stock of your own pads using a simple hand punch.

These punches are widely available on eBay or possibly at your local hardware outlet or craft store. They come with various sized dies but I have only found myself using two sizes, 5/32 and 3/16. The punches have a small point at the center which I filed off so not to create a dimple in the punched pad.

It's also advisable to scuff sand the bottom of the PCB strip as well as to shine up the copper side with some light steel wool before punching any pads. They will eventually be glued to the circuit's PCB copper surface using a

small dab of CA ("super glue") glue and the slight scuffing beforehand will ensure that the pads stay put. My usual technique is to place a tiny dab of glue with a toothpick at the spot where the pad will go. I then pick up the pad using an X-acto knife, spearing the pad's copper side and then pressing it down on the glue spot. CA cures quickly once it is oxygen-starved so pressing down on the pad for a few seconds is usually all that is needed. Any time I have run into trouble it was because I used too much glue... just a small dab is needed.

There are many good tutorials on Manhattan-style construction to be found on the internet as well as some super examples of what can be accomplished using this method as a "final" version technique.

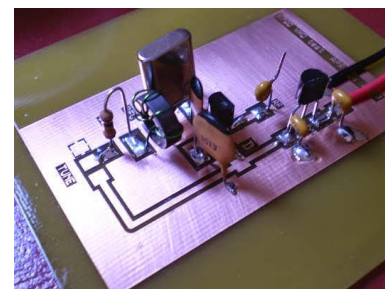
For me, one of Manhattan's strongest selling points is that even though final part values may have been fleshed out during a rough build, parts can still easily be changed, added or even removed without a lot of fuss... unlike a PCB... but Muppet does look interesting!

[The type of punch shown is available from eBay at: <https://goo.gl/uQ92nn>]

Steve McDonald, VE7SL, is a regular contributor to [AmateurRadio.com](http://AmateurRadio.com) and writes from British Columbia, Canada. Contact him at [ve7sl@shaw.ca](mailto:ve7sl@shaw.ca).

WEB - "The VE7SL Radio Notebook": <http://qsl.net/ve7sl/>

VE7SL BLOG - "Homebrewing and Operating Adventures From 2200m to Nanowaves": <http://ve7sl.blogspot.ca/>



January 2019



## Tidbits from the Amateur Radio World

Michael Birtles VE7GMP

### *VECTOR's November VHF Contest*

"I believe I first heard about the November 17th VECTOR QSO Party from a handout at a SARC meeting, it was then advertised through the Communicator. As a new ham with a strong interest in HF, I had not yet participated in any VHF/UHF contests and it seemed an interesting learning opportunity. Having also been given the chance to participate with VECTOR in support of the last Vancouver Celebration of Lights, I was excited to get on the air with the fine folks to our west.

Our club president Stan had mentioned that this contest would be all about the elevation, especially with the scoring system heavily encouraging contacts across as many of the Lower Mainland municipalities as possible. In light of that, and my limitation of operating QRP (<10W) from a handheld, I decided that an expedition to the top of Golden Ears with a Yagi-Uda would be in order. I had climbed it a month prior and noticed an almost perfect line-of-sight west to Vancouver and Nanaimo, south to Victoria and Bellingham, and east to Abbotsford. I reasoned (with the sort of confidence that can only come from inexperience) that the right Yagi-Uda on a tripod would help propel my score near the top of the pack, no matter the competition.



I decided to make my own Yagi-Uda after discovering the aluminium stock required would cost in the area of \$8 CAD. 10' of 5/16" Al rod for three elements, and three feet of 3/4" Al square as a boom, a short length of RG-58/U for a basic choke, a small plastic enclosure to hold the split active element, and a SO-239 chassis connector cost a grand

total of \$15 CAD. I decided to build a three-element antenna as it would be easier to pack the boom, quicker to build, and would in theory be easier to tune.

I drew inspiration from a wide variety of online resources and calculations, but ultimately settled on one of DK7ZB's simpler three-element designs [<https://goo.gl/BYuwYw>] for precise measurements, he has a wide range of Yagi-Uda experience and the simple design suited my wishes in a first antenna.

All this research and planning meant that antenna construction and packing for the overnight lasted well into the morning of the 16th, the Friday I had set aside for actually making it up the mountain before the contest on Saturday the 17th. I decided to settle for Plan B instead, the Burnaby Mountain Conservation area on the west side of Burnaby Mountain. With the reasonable elevation advantage, Vancouver right-the-way-around to Langley would be line-of-sight. Encouraged on by a few interested looks and comments Saturday morning, I had the Yagi-Uda on a tripod and my Authentic Ham Class J-Pole four meters up in a tree by the time 10:00 rolled around. My initial excitement was met by silence on the air, leaving me wondering if I had missed some detail in programming the pre-determined simplex frequencies and sub-tones into my Baofeng BF-F9 V2+. After twenty minutes of calling CQ and re-reading Miklor's excellent programming guide, I made contact with the QSO Party's organizer, Hiroshi Takahashi. It turns out my radio was correctly set up all along, I just had to wait for the right person on the other end.

The first hour was rather slow, netting four high power contacts in Vancouver and New





Westminster. The second was somewhat better, as I made another four contacts between Vancouver and Richmond in the first thirty minutes, however by 11:30 I decided I had to change things up. A very high noise floor from the adjacent transmitters on SFU buildings up the hill combined with the relatively broad bandwidth (141-149 MHz <1.5:1 SWR) of my home-built Yagi-Uda, and the lacking design of Baofengs probably all contributed to a lack of contacts. Taking a break, I managed to raise my Authentic Ham Class J-Pole six or so meters up in a spruce with some fishing line and bottle tossing on a more southerly facing "mountain" face. Together with my solid, reliable 30+ year old HTX-202 [<https://goo.gl/4hgMQ4>], and the refreshing power of clear skies and bright sunshine, I made my last eleven contacts in under an hour, squeezing in one final low-power contact in Pitt Meadows right before the contest end at 13:59.

The entire experience was truly enjoyable, I had the opportunity to participate in a new (to me) contest format requiring a different set of strategies as compared to HF contesting, and learned plenty in the process.

I learned that if I intend to compete from Golden Ears next year I will need a more directive antenna and a bit more time to prepare. Most importantly however, more participation from hams in the Lower Mainland, NW Washington, and perhaps the Island would greatly contribute to a very interesting event. The area already boasts a very vibrant and active HF contesting community, many of whom are more than well enough equipped for such a "simple" VHF contest, yet for next year's VECTOR QSO Party to be a resounding success the word needs to be spread. Not only does the event offer a fun challenge and learning opportunity for younger or newer hams, it is an excellent chance for those well-versed in the hobby to practice ever-useful emergency communication skills. Do you know how easily you can communicate with your municipal neighbours? Participate next year to find out!"

~ Michael Birtles VE7GMP

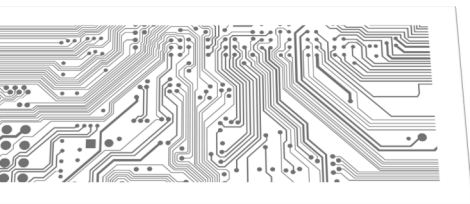
Callsign	Points	VECTOR member?	Total Number of contacts
VA7URE	135	Y	35
VA7LET	118	Y	28
VE7PNP	94	Y	14
VA7MN	71	Y	21
VE7CNV	47	Y	7
VA7ETR	34	Y	4
VA7KBM	158	N	39
VA7SGY	138	N	18
VA7XP	133	N	33
VE7GMP	119	N	19
VA7RER	112	N	22
VA7ITJ	109	N	9
VA7TEV	47	N	7
VE7QIN	23	N	3
VE7JRX	21	N	1

*Thank you for your support! We had logs submitted that were from 1 to 39 contacts. I heard people from all over, some did not submit their logs, but oh well... Here are the results I have as of last week. Most likely we will run one again next Nov. 16th I think will be the date.*

~ Hiroshi Takahashi  
Contest Coordinator



January 2019



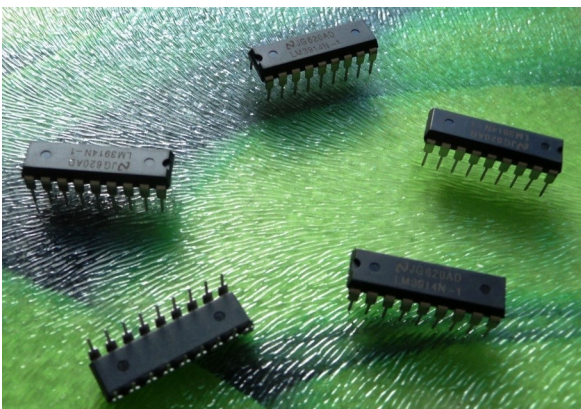
# TECH TOPICS

Daniel Romila VE7LCC

## *Fun Applications of the LM3914 and LM3915 Integrated Circuits*

In a previous May 2018 article in The Communicator, [page 36, "Digital S-meter"] I presented the integrated circuits LM3914 and LM3915 as possible replacements of analog signal strength indicators for ham radio equipment.

They have 18 pins and they are pin by pin compatible. The LM3914 has a linear characteristic, while LM3915 has a logarithmic characteristic.



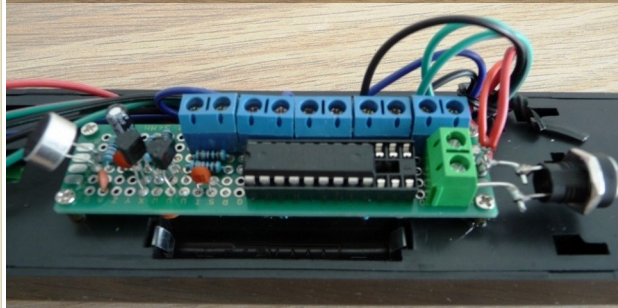
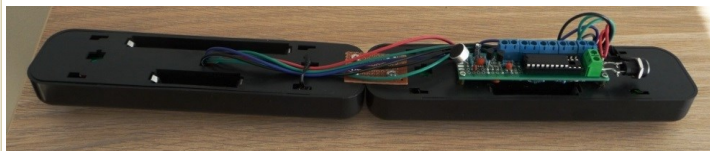
These ICs can handle 10 LEDs in a kind of VU-meter indication. They require just a few components around them. In the case of the LM3914, it requires 0.14 Volts input for the first LED to be lit, 0.26 Volts for the second and so on, with equal steps until the tenth, which requires 1.26 Volts for the LED to be lit. The display can be a bar or a moving dot style.

The best computer programs for simulating the LM3914 are Proteus and Circuit Wizard. Unfortunately, my favorite, NI Multisim, does not have those ICs in their library and making models for them is tedious.

Since theoretical explanations are dry, I built this VU-meter, and you can see it in action on YouTube at:

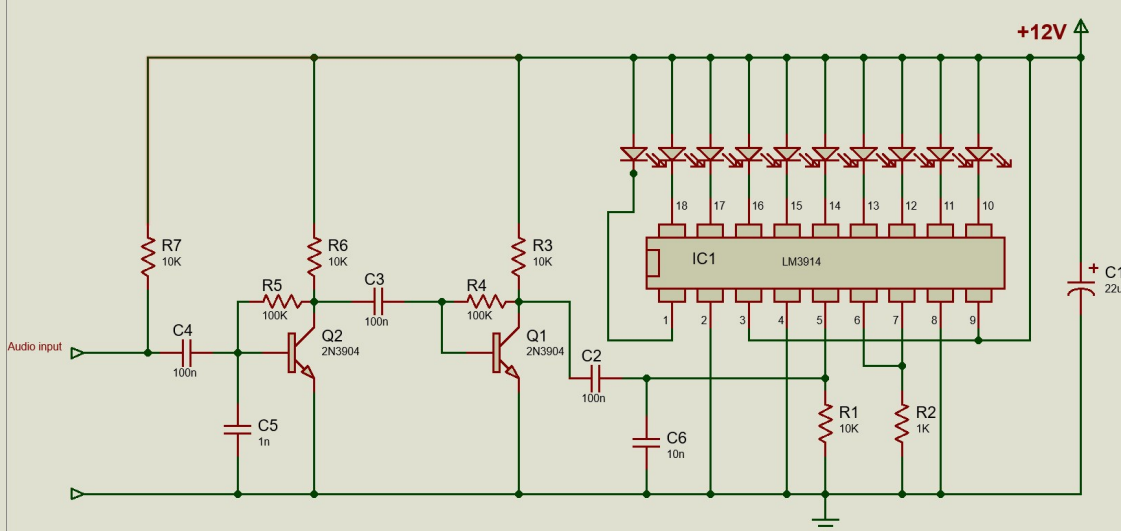
<https://www.youtube.com/watch?v=dAlmXjgf0E4>

I had two small lamps bought from Dollarama each with 5 white LEDs. I took the LEDs out, replaced them with colored ones and separated the electrical circuit for each. I used 5 mm LEDs. Since these Dollarama lamps have mirrors behind the LEDs the generated light is quite strong, as in the video.



I used a larger socket for the LM3914 integrated circuit because I initially intended to use a microcontroller with this VU-meter, which would have been overkill. I have a kind of love connection with ATMEL micro-controllers, which are smart and cheap - it practically does not matter which integrated circuit one buys or what the IC knows how to do, the price is in the range of cents to dollars.





I simulated the schematics on the computer before soldering on the PCB. I use an electret microphone and a two BJT 2N3904 pre amplifier in front of LM3914.

~ Daniel VE7LCG

I received one of these microcontroller development boards. I bought what I thought it was the cheapest Arduino Nano.

But it is not Arduino Nano. It is "Arduino Nano like". The microcontroller onboard is not a clone of the (AVR) Atmega 328P, but a more advanced microcontroller, the ALPHA 8F328P-U. It simply does not work with the Arduino software without supplementary add-ons.

Anyhow, I put this Chinese version in operation. It can operate at 32 MHz instead of 16 MHz, and also contains DAC.

Please see my video at:

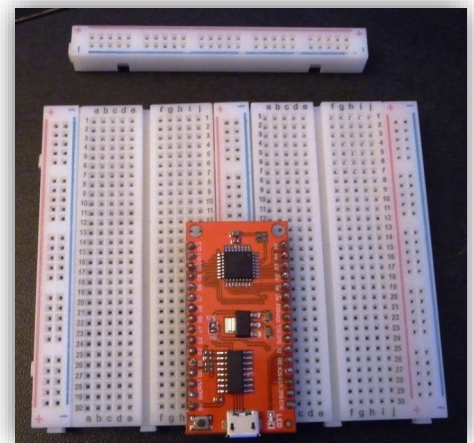
<https://www.youtube.com/watch?v=ZNcBfoSgNIg&t=34s>

Potential buyers beware! Don't be cheap like me unless you want to embark on an adventure!

In my experience the Chinese accept an electronic component for manufacture only if they are given full documentation and full rights to the intellectual property for the component you intend to manufacture. And, after a month they come out with a better product than the original because they were given the blueprints. They do not even bother to translate datasheets to English anymore. And, like the Germans and Japanese in their time, they keep the best only for the Chinese market.

Seriously, if you hear about a free Chinese course, I must do it.

~ Daniel VE7LCG

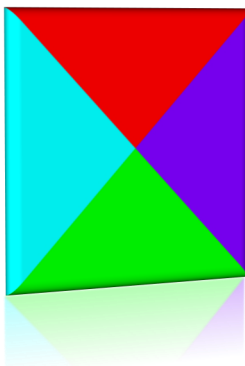


## Thomas N1SPY chases mini satellites on a budget

Using \$25 worth of equipment to chase signals from cubesats which are the size of a coffee can. Project completed with a homemade antenna, \$5 worth of materials and a \$20 RTL SDR receiver. Did it work? You be the judge! <https://www.youtube.com/watch?v=t5pihYcRWPA>



January 2019



## Foundations Of Amateur Radio

VK6FLAB Onno Benschop

### *Episode 172: Antenna Polarization And You*



*For the audio  
podcast:  
Foundations of  
Amateur Radio*

The first time I came across the concept of antenna polarization was a decade before I became a radio amateur. To connect to the internet while driving around Australia I became the proud owner of a portable satellite dish. Portable in the broadest sense of the word, 150 kilos with a dish that's 2.4m high, 1.8m wide, steel base, electronics, power and patience to erect and point.

The dish has a receiver and transmitter component that needs to be aligned, just so, in order to be able to have two-way communications using 5 Watts into geosynchronous orbit. The transmit and the receive are exactly 90 degrees offset from each other. One is called horizontal polarization, the other vertical.

The first thing to observe is that if you're using the wrong polarization, it doesn't really work well. We'll get into what is right in a moment. Depending on where you ask, the definition of not working well can be as bad as 40 dB loss.

Just let that sink in for a moment.

If you want to punch through with more power, you'll need to bring 10 kilowatt with you for the receiving station with the opposite polarization to hear 1 Watt.

If you're using a VHF or UHF FM radio in your car, you're likely to have a vertical antenna. The combination of a repeater on a hill and a radio in a car adds up to much more than the two alone. The line is blurred today because repeaters are very popular and home-base stations are

becoming smaller and smaller by the week, so vertical antennas for VHF and UHF at home are today just as common as they are on cars.

It wasn't always that way. In fact, in HF, it's almost never that way and if you're a fan of Tropospheric Ducting or long distance VHF, then you'll also shy away from vertical antennas.

Let me explain.

If you want to erect a HF antenna and you want it to rotate and you want it to be high enough off the ground, you'll build the simplest mast you can get away with. Imagine a HF Yagi. It's got several elements, long to short along a boom, rotator somewhere in the middle. If you mount this Yagi horizontally, your mast will be around half a wave length in height.

If you mount the same Yagi vertically, aside from the height discussion - should it be mounted higher or not - now your mast becomes another interfering element within your Yagi. The steel wires that keep your mast standing will also interfere with the Yagi elements and your elements will be closer to the ground where they can potentially cause harmful radiation.

So from a mechanical perspective, putting a Yagi on a mast vertically is not trivial.

From a radiation perspective you may theoretically get some gain, but adding an element or two will make up for any potential gain that a vertical arrangement interacting with Earth might assist with.

There's another reason. The ionosphere. It sounds like a smooth billiard ball, it's drawn as a uniform layer around the earth, but in reality, clouds and their appearance are much more likely to represent the actual surface shapes that the ionosphere presents to your radio waves.

A signal coming in one way is unlikely to come out at the other end in the same way and vice versa.

That's HF. On VHF and UHF a horizontal signal and a vertical signal when they're used with line of sight are pretty similar, but once you get beyond that, a horizontal signal will travel further, how exactly is a story for another day. If you're doing point to point VHF or UHF contesting, horizontal is the way to go.

What about a single HF vertical?

It's excellent for a portable station, it is simple to set up, works in all directions, but it means you'll be able to hear all the local man-made noise as well, so find a quiet spot near the beach if you can.

So what's the right way? Almost always horizontal, except on cars or when you're on a DXpedition on a beach sipping pina collada and getting caught in the rain.

~ I'm Onno VK6FLAB



## ***Episode 178: Everything you wanted to know about amateur radio but were afraid to ask!***

There are people who ask questions and there are people who answer them. Sometimes the people who answer even know what they're talking about, but sometimes they just repeat what they've been told without any form of critical thought.

The reason I raise this is because when you're a new amateur with a shiny new license, you're like a little puppy dog, going from tree to tree to have a sniff. Does this smell good, what about this, ooh, that's a nice smell, I wonder what it tastes like.

Puppy dog analogies aside, as a new amateur you're filled with questions and uncertainty. You don't know what you don't know, you don't know how much you don't know, your license is still wet, so even if you know something, it might not be true.

Interestingly the more I look at this, the more I find that new amateurs, filled with questions are more likely to dig around in the fundamental understanding of things and learn something along the way.

I've been around this community for a little while now. I obtained my license in 2010. I've learnt a lot of different things about this hobby, how it works, what the mechanisms, phenomenon, etiquette, physics and so-on make amateur radio work. Most of the time I'm learning about some or other new thing. Right now I'm learning about what a Vector Network Analyser is and how it works, so I can explain it to someone else.

Foundations of Amateur Radio is about how stuff works, much like Joe Kaufman's book - What makes it go? Though I read it in Dutch when I was growing up - Hoe zit dat in elkaar? There's another series of books by David Macaulay that are my inspiration, The Way Things Work, Unbuilding, Underground and Motel of The Mysteries to name a few.

It seems that my drive to ask questions is fundamental to my existence, my uncertainty doesn't scare me off, in fact the opposite is true, it gets me asking more questions, learning more things, gaining a deeper understanding and finding out more than I ever dreamt was possible.

January 2019

To listen to the podcast, visit the website: <http://podcasts.itmaze.com.au/foundations/> and scroll to the bottom for the latest episode. You can also use your podcast tool of choice and search for my callsign, VK6FLAB.

All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: <http://amazon.com/author/owh>.

Foundations of Amateur Radio Volume 7 is out now - with chapters on digital modes, coax connector loss, waterfalls, station performance and more.

Feel free to get in touch directly via email: [onno@itmaze.com.au](mailto:onno@itmaze.com.au), or follow on twitter: @vk6flab (<http://twitter.com/vk6flab/>)

If you'd like to join a weekly net for new and returning amateurs, check out the details at <http://ftroop.vk6.net>, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, AllStar Link and 2m FM via various repeaters.

ITmaze -ABN: 56 178 057 063

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If you're a new amateur, I'd recommend that you attempt to keep your curiosity alive. When you're faced with a fact, question it, attempt to discover what is underlying the response.

There are amateurs who think that to ask the question, Why is the length of a dipole calculated using some random constant? - is the equivalent of heresy, lack of skill, incompetence and the source of much derision, when it's clear that even a cursory search reveals that not only is the notion incomplete, it's wrong for most, if not all, examples.

My perspective is a little different and I'll admit that for some it might be confronting.

Why is it so?, What makes it go?, How come? and Why? are all questions to live by. You might conclude that a world where there are no certain answers is a scary place, but for my money the opposite is true.

Just because you think it's simple and answerable, doesn't make it so. If you walk in with your eyes open asking questions, then you'll be much more prepared for an unexpected response.

If you've just obtained your license and you're not sure about something, ask. You might not like or understand the answers, but that is just a recipe for more questions. Don't be deterred by those who provide certainty, the more certain they are of their answer, the more you should ask.

Amateur Radio is about experimentation, it's a license to play, a license to explore, it's a license to investigate.

For me Amateur Radio is encapsulated in a quote attributed to Albert Einstein: The more I learn, the more I realise how much I don't know.

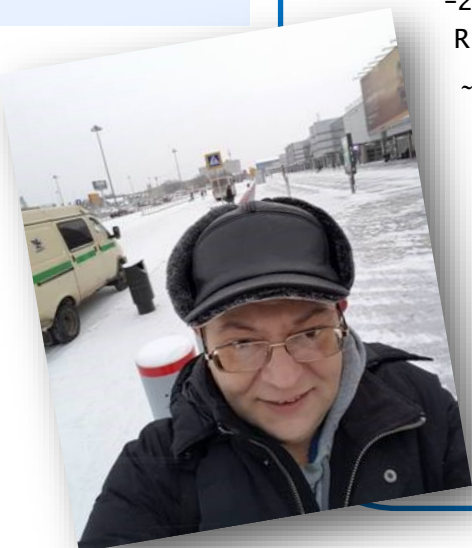
~ I'm Onno VK6FLAB

## Brrrrr!

Bad, that I forgot my hat, because now I'm really in winter ( -10 to -20 Celsius) I now work in Yekaterinburg, Russia 200 meters to RF9C.

~ 73 Slawa  
VE7LWW / ER1LW

Yekaterinburg is a city in Russia, east of the Ural Mountains. It's known for the golden-domed Church on the Blood, built in the early 20<sup>th</sup> century on the site of the 1918 Romanov executions. The Monument to the Founders stands by the banks of the Iset River. Exhibits at the nearby Sverdlovsk Regional Local Lore Museum include the Hall of the Romanovs, with personal items that belonged to the last royal family.







## Ham Recipes

Paulette Schouten VE7VPE

### Antipasto

*I had an interesting feedback comment from a non-amateur who wondered why we published a newsletter about hams - confusing us with the edible kind from piggies. Here at the SARC Communicator we would like to serve every reader and potential reader so we publish our first ham recipe this month.*

Serve at room temperature on freshly baked, crusty Italian bread, or as a sandwich or canape spread.

Paulette recommends: "I bought the smallest size tins I could get for most ingredients, but increased the quantity of those that were my favourites, such as the black olives and sweet mixed pickles.

You will know if you don't have enough ingredients if the sauce is too runny."

- 55 ounces (1.5 kg) bottle ketchup
- 15 ounce (500g) bottle hot ketchup
- 2 cups (500 ml) white vinegar
- 20 ounces (568 ml) bottle chili sauce
- 2 cups (500 ml) oil (vegetable or olive oil)
- 3 jars pickled onions (drained-as many onions as you like)

Mix ingredients in a large pot and boil for 10 minutes ; salt to taste. To this add:

- 2 tins drained pieces and stems mushrooms
- 1 jar large dill pickles (sweet mixed) diced-as many pickles as you like
- 2 tins green beans (diced)

Boil for another 10 minutes. To that add the following (chop, but leave semi-chunky):

- 2 tins pitted black olives
- 3 jars green olives
- 2 pounds (900 grams) green peppers
- 2 pounds (900 grams) cauliflower (parboil for 5 minutes)
- 2 tins anchovies (optional)
- 6 tins chunk tuna

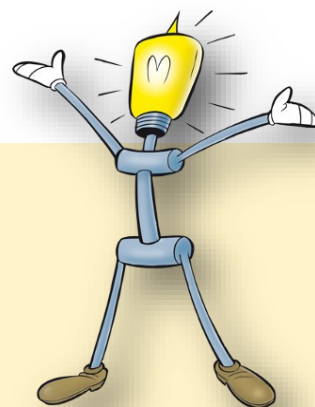
Handle gently and boil for 5 minutes. Your antipasto is now complete. This recipe makes a huge quantity. It can be kept in the fridge in a sealed container and it freezes well.

~ Paulette VE7VPE  
The CLARA Cookbook

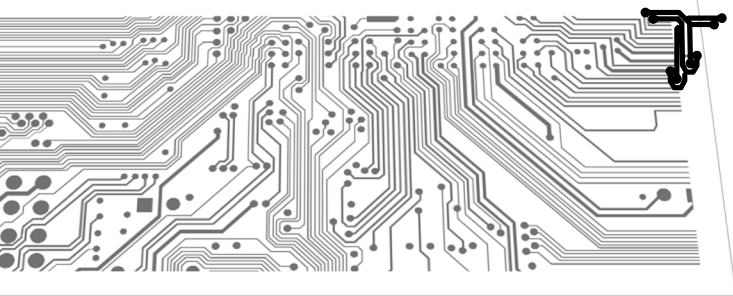


## LED Lamps Can Cause EMI

Interference has been noted coming from these devices. It's not the device, but the switching power supply that often creates hash and EMI when we least expect it. There's an illuminating article at <http://www.ledbenchmark.com/faq/LED-interference-issues.html>



January 2019



# TECH TOPICS

Daniel Romila VE7LCG

## *A Closer Look At SDR Dongles*

We had a conversation several months ago about SDR and SDR dongles. I recently played with a [nano version](#). It is probably a knock-off of the Nooelec.

I can tell you my findings:

- It has to be connected on the USB computer port with an extender, otherwise the electric noise generated by the computer makes it unusable and completely deaf.
- It has not much shielding it; acceptable if it is not case to case to the electric noise generator, but at several centimeters apart, it is fine. I tried to shield it in metal, and it did not make any difference, in various test situations. I suspect it is already shielded somehow inside, or partly shielded inside.
- In the commercial FM band it is a cheap stereo and more important, an RDS receiver. It knows to display the name of the station, the songs that are played in that moment and whatever digital info the station sends in addition to the analog signal. The sensitivity in FM is way worse than 2 microvolts. Any dedicated commercial receiver amplifier, including my roommate's Yamaha 2 micro V (and every single FM radio in the apartment we have, including clock radios, MP3 portables (the radio part) are more sensitive than the SDR dongle. Also, I am using a proper dipole antenna on the balcony, connected with coax cable to the SDR dongle, while all other 7 receivers have just a small piece of wire. I estimate somewhere at 30 - 50 microvolts sensitivity in the 88 - 108 MHz band.
- The characteristics differ very much on the Rx bands and require adjustment from the RTL dongle settings. That means RF Gain; RTL AGC; Tuner AGC. It seems it does not like the 50 MHz band and the sensitivity is not great in this band. I confirmed the bad findings of everybody writing about this issue on the Internet.
- In the 144 MHz band, with a good dipole, it receives everything the Kenwood 7950 and the Chinese walkie-talkie receives. It likes this band and it has good sensitivity. All repeaters from Victoria, Port Angeles, Nanaimo, Cowichan are 59.
- It also likes the marine band, air traffic band and the weather band. They are all around 150 MHz and once the settings are done for one station, they can be kept in the weather, marine, 2 meter bands.
- It is stable. I did not feel the need for a more stable oscillator. It did require adjustment in the software, -200 ppt for my dongle. This is considered a huge adjustment. I verified with encapsulated quartz oscillators (32 MHz, 125 MHz, 150 MHz, the 28.197 CW beacon), and indeed it needs that huge adjustment.
- The CB band and the beacon on 28.197 MHz (VE7MTY, Pitt Meadows, continuous, CW) are in a band where the RTL dongle is not so sensitive. The beacon (nearby me) booms in my SONY ICF7600G portable radio, with its telescopic antenna. The SDR dongle with

a CB whip on the balcony receives it almost OK, but only because I was hunting for the beacon and I knew where it is. The beacon's signal barely produces a trace in the display spectrum, and I am nearby it (exactly 13.89 km away).

- There are images everywhere. The FM band (88 - 108 MHz) can also be received on 30-50 MHz. The worse thing to do is to use an upconverter, as I saw so many on the Internet, with an NE612, and wide non-tuned input. I tried, and the images kill any useful signal. In the end I did 2 converters, in order to cover 3.5 MHz to 30 MHz, one for the lower part and one for the upper part. I used NE612, attacked by an amplifier with a BF998 in front. I have a tuning circuit just at the antenna, and 2.4 K resistor + coil in the output of the BF998 drain. The source terminal is connected directly at the ground and the BF998 is power supplied with 9 V (12 V is max in datasheet, and it does burn-up beyond 12 V). The oscillator is an encapsulated 3.3 V powered oscillator, in a socket, to easily changed. The best it worked for me is at 150 MHz, so stay away from FM commercial band and upconvert the shortwaves into a sensitive band that the SDR dongle likes. I can adjust the signal from the oscillator to the value from the NE612 datasheet, but actually it does not make any difference even if it is provided with 3 V (NE612 has a buffer in it before the mixer).
- The only program that totally works in Windows is SDR Sharp. It has plugin to decode CTCSS tones and display their value. All other programs partly work (not all modulation types; there are workarounds for stereo; workarounds for drivers and so on). SDR Sharp simply works, all options, everything that the hardware is capable of.
- The noise of the first element in the SDR dongle must be better than the BFR91A. I tried a wide range untuned amplifier with 1 BFR91A, and it did not bring in anything, just noise. The situation changed when I put a SAW 88 - 108 MHz (3 pin filter) in front of the BFR91A, and it helped.
- It does not run hot. Whatever other users noticed with old SDR dongles is no longer an issue with my SDR small dongle.

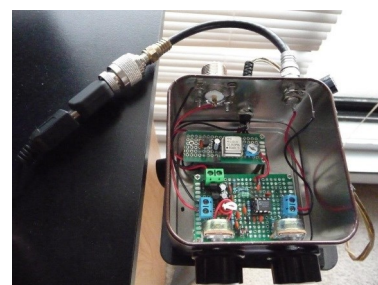
### Final conclusions:

- The SDR dongle is the cheapest 2 meter receiver a ham radio can buy, and works as a receiver on par with dedicated equipment, which is generally limited by the line of sight, not by sensitivity. A beginner can listen to the weekly nets for some \$8-11 CAD, shipping and taxes included.
- The SDR dongle is the cheapest FM commercial RDS receiver one can have, capable of displaying the digital data continuously transmitted by almost all stations in Vancouver.
- The SDR dongle was not meant as a general coverage receiver. It was designed as a DVB-T television European standard receiver, and probably it is better for that purpose.

~ Daniel VE7LCG

*[Right] This is my upconverter for the SDR dongle, inspired from many articles, but not a copy. I always put the dual gate MOSFET BF998 with the S at the ground and the D in a series 2.2 K $\Omega$  plus 1 mH molded shock. The BF998 has a different behaviour than a BF981, and very much different than a 40673.*

*The values are for the 10 MHz - 30 MHz upconverter. With this upconverter in front the combination SDR dongle + converter is more sensitive than the SONY 7600G - probably somewhere close to 1 micro V. But it has to be adjusted every 500 KHz or so, otherwise the 28.197 MHz beacon is lost .*





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## Arduino!

### *Opens Up Diverse Amateur Radio Possibilities*

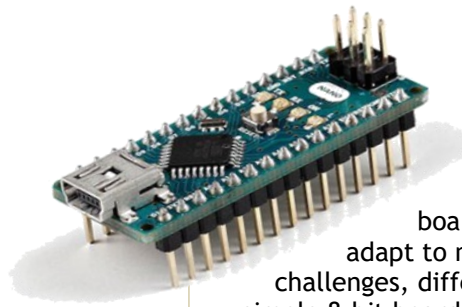
*Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world.*

#### **What is Arduino?**

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing

Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.

Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming.



As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IoT applications, wearable, 3D printing, and embedded environments. All Arduino boards are completely open-source, empowering users to build them independently and eventually adapt them to their particular needs. The software, too, is open-source, and it is growing through the contributions of users worldwide.

#### **Why Arduino?**

Thanks to its simple and accessible user experience, Arduino has been used in thousands of different projects and applications. The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux. Teachers and students use it to build low cost scientific instruments, to prove chemistry and physics principles, or to get started with programming and robotics. Designers and architects build interactive prototypes, musicians and artists use it for installations and to experiment with new musical instruments. Makers, of course, use it to build many of the projects exhibited at the Maker Faire, for example. Arduino is a key tool to learn new things. Anyone - children, hobbyists, artists, programmers - can start tinkering just following the step by step instructions of a kit, or sharing ideas online with other members of the Arduino community.

There are many other microcontrollers and microcontroller platforms available for physical computing. Parallax Basic Stamp, Netmedia's BX-24, Phidgets, MIT's Handyboard, and many others offer similar functionality. All of these tools take the messy details of microcontroller programming and wrap it up in an easy-to-use package. Arduino also simplifies the process of working with microcontrollers, but it offers some advantage for teachers, students, and interested amateurs over other systems:

**Inexpensive** - Arduino boards are relatively inexpensive compared to other microcontroller platforms. The least expensive version of the Arduino module can be assembled by hand, and even the pre-assembled Arduino modules cost less than \$50

**Cross-platform** - The Arduino Software (IDE) runs on Windows, Macintosh OSX, and Linux operating systems. Most microcontroller systems are limited to Windows.

**Simple, clear programming environment** - The Arduino Software (IDE) is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well. For teachers, it's conveniently based on the Processing programming environment, so students learning to program in that environment will be familiar with how the Arduino IDE works.

**Open source and extensible software** - The Arduino software is published as open source tools, available for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR C programming language on which it's based. Similarly, you can add AVR-C code directly into your Arduino programs if you want to.

**Open source and extensible hardware** - The plans of the Arduino boards are published under a Creative Commons license, so experienced circuit designers can make their own version of the module, extending it and improving it. Even relatively inexperienced users can build the [breadboard version](#) of the module in order to understand how it works and save money.

### **How do I use Arduino?**

See the [getting started guide](#). If you are looking for inspiration you can find a great variety of [Tutorials on Arduino Project Hub](#).

*The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P (Arduino Nano 3.x). It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.*

*You can find in the Getting Started section all the information you need to configure your board, use the Arduino Software (IDE), and start tinker with coding and electronics.*

### **Need Help?**

- *On the Software on the Arduino Forum*
- *On Projects on the Arduino Forum*
- *On the Product itself through Customer Support*



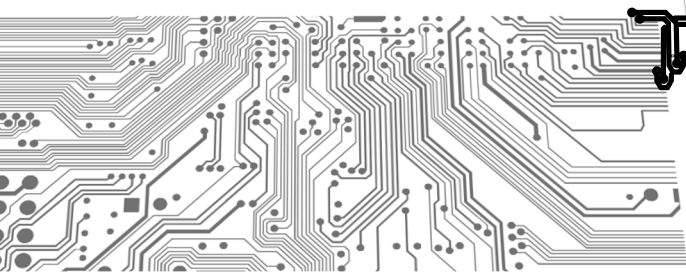
### **Some notes from Daniel VE7LCG**

In all presentations of the Arduino platform, the preferred board to talk about is the Arduino UNO, v3 shown above. That is because:

- all colleges, universities and schools work with that board. That is meant for re-use and re-use in learning.
- -all "shields" are made to be put on top of Arduino UNO. Those accessory boards do not match the Arduino NANO.
- all authors, with whatever board they work with, they always specify the pins (name and number) as in Arduino UNO. This is a classic rule that keeps all projects easy understandable and easy to reproduce, whatever Arduino "fake" boards are used
- the Arduino UNO has a design mistake in one of the pin heads, mistake that many of us carry on - again, as common reference and common language

Of course, the Arduino UNO v3 from the attached picture is used in academic/schools world, mostly. There are fake Arduino UNO v3, better than the original, same size, same pins, just with a surface mounted soldered microcontroller (no more mechanical contacts, so more reliable) and replaced FTDI chip (USB communication) with faster CH340 chip.

January 2019



# TECH TOPICS

Daniel Romila VE7LCG

## Review Of An Arduino Type Development Board

I wanted to buy an inexpensive Arduino Nano development board, which was supposed to have in it an AVR Atmega 328 microcontroller. You can configure Arduino boards to construct a CW keyer with just 10 external components, a CTCSS decoder/encoder, light play and a lot of other interesting things. There is plenty of literature and YouTube video about, so it is easy to start and jump into this microcontroller's practice and use.

Because I was more than cheap - let's just say directly that I was stingy - I bought the cheapest Arduino Nano board I found on a Chinese websites, \$2.37 Canadian dollars, shipping and taxes included. What I did not notice at that moment was that it was not an Arduino Nano board; it was not even a clone; It was a totally different board, just 20 cents cheaper than an Arduino Nano board which would have had a genuine Atmega328P-U microcontroller in it.

I noticed this detail only after the board finally came from China and I tried to put it to use.

I immediately noticed that the pinout is different. That means that any shields (accessory boards made to fit with pin headers above or under the Arduino Nano board) will not work. I was anxious to find what else was different and

how much time I should spend with it before throwing it in the garbage bin. But please keep reading, because it does work with Arduino circuits (programs), tools and software, plenty of which are available on the Internet.

I connected the board to the USB cable coming from my computer. The blue LED on the board started to blink. This is because these type of Arduino Nano boards (or Nano like!!!) come preloaded with a

sketch called BLINK which makes the LED come ON for a second and OFF for a second, and so on. The RESET button on the board was also working - for some 2 seconds it interrupted the execution of the program and restarted the existing BLINK sketch.

This was a very good beginning, although clearly it is not an Arduino Nano board and troubles were about to appear in my life.

I verified the board was recognized by the computer. It was.



USB TO UART  
BRIDGE

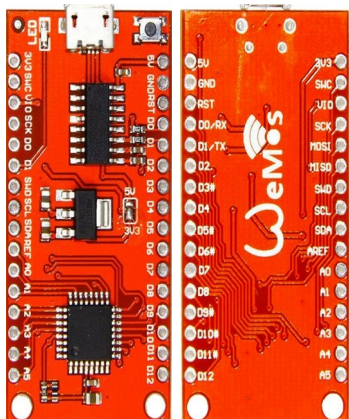
The device was assessed to be working properly. I looked at what kind of chip was in the USB to UART bridge and I found it to be *Hetai Holtek HT42B534-1*. It supports up to a 3Mbps baud rate. On the first page of the English version of the datasheet it was not clear if an .inf file is necessary just for older versions of Windows or if it is also required for Windows 10. The datasheet is at:

<http://www.holtek.com.tw/documents/10179/1842/HT42B534-xv100.pdf>

I looked in the Windows 10 control panel, Device Manager, at ports, and I found everything was recognized, no exclamation sign, but there was a warning at the EVENTS tab: "Device USB\VID\_04D9&PID\_B534&MI\_00\7&a4a7c0f&0&0 000 requires further installation." This did not look good, so I installed the Hetai Holtek driver that I found at the bottom of their webpage:

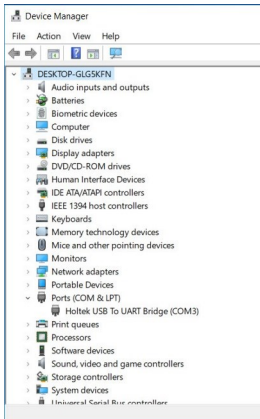
<http://www.ocrobot.com/doku.php?id=ocrobot:alpha:8f328p-u:main>

I had to use Google translate from Chinese to English. After installing the driver, which is a universal driver, the information in Windows 10





device Manager changed to:



Somewhere in the middle of this development board there is a solder jumper with 3 very small pads. It has a position for 3.3V and one position for 5V. Let's be very clear, this is a 3.3V board, with some 5V capabilities, not a dual voltage board. In plain

English, the board must stay at the 3.3V jumper selected position, as it was soldered at the factory when connected to the computer for programming. While the USB communication chip knows both 3.3V and 5V modes, decided by the voltage applied to the pin called VDDIO (pin 10 in the 16 NSOP A package), this pin is permanently connected to the pin V330 (pin 3 in 16 NSOP A package) by board soldering. It is a surface mounted device, so modifications by cutting and adding wires like those suggested by Tim Black at:

<https://www.youtube.com/watch?v=xLLt10UHJS0> is not something I would do. If,

when programming the board with the computer, the jumper is somehow set at 5V, the upload of the sketch into the microcontroller will fail, because the USB communication chip would work in 3.3V logic and the microcontroller in 5V logic. The jumper is just for the microcontroller voltage. After the sketch is uploaded into the microcontroller, the jumper can be put at 5V and the eventual peripherals to the microcontroller would work at 5V. Please view my video in which I verified with a voltmeter that both 3.3v and 5V modes of the sketch for 3 LEDs will cause them to blink:

<https://www.youtube.com/watch?v=ZNeBfoSgNlG&t=40s>

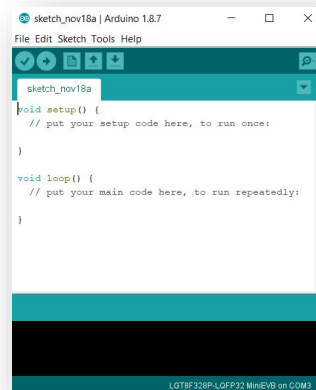
In order to connect the board with external devices I choose to



solder male headers, that will fit breadboards.

The best breadboarding for me required two small breadboards in parallel, with the power strip removed from one of the boards. A single breadboard is simply not wide enough *[photos right]*.

I do the programming from a laptop with Arduino IDE.



It can be downloaded from:

<https://www.arduino.cc/en/Main/Software>

After installation of Arduino IDE it is necessary to copy into its folder the LGT support package (all files, directly into the Arduino main folder) from:

[https://github.com/LGTMCU/Larduino\\_HSP](https://github.com/LGTMCU/Larduino_HSP) *[right]*

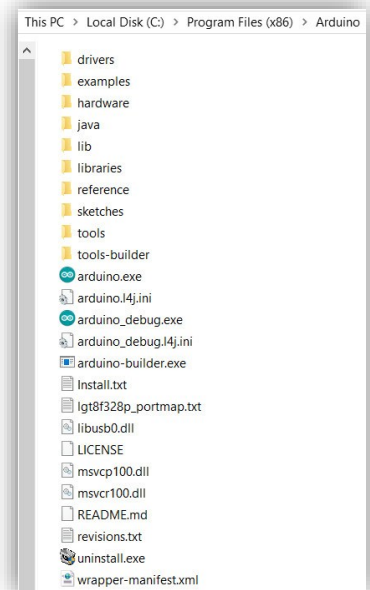
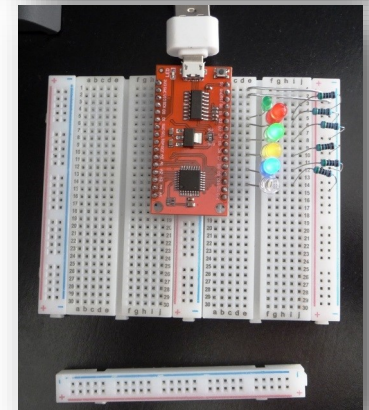
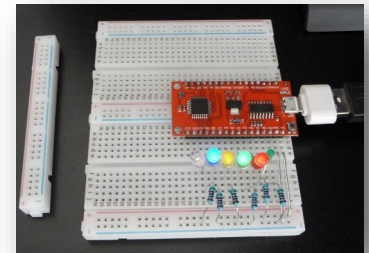
I also use OCROBOT IDE, which knows more boards than the original ARDUINO IDE.

The closest schematics of this board that I could find is the schematic of Ocrobot Alpha 8F328P-U at:

[http://www.ocrobot.com/lib/exe/fetch.php?media=ocrobot:alpha:8f328p-u:alpha\\_8f328p-u\\_r1.pdf](http://www.ocrobot.com/lib/exe/fetch.php?media=ocrobot:alpha:8f328p-u:alpha_8f328p-u_r1.pdf)

The only difference I noticed is the connection of the onboard LED. The microcontroller 8F328P-U has a complete datasheet, but only in Chinese. The datasheet has 267 pages and while it is in Chinese the diagrams contain enough English to be useful.

It was an adventure to put this board into use. Although not Arduino Nano, up to now it has accepted all the sketches that I

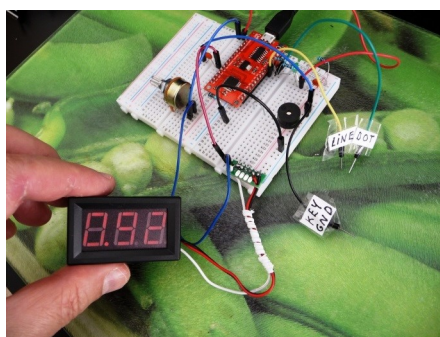
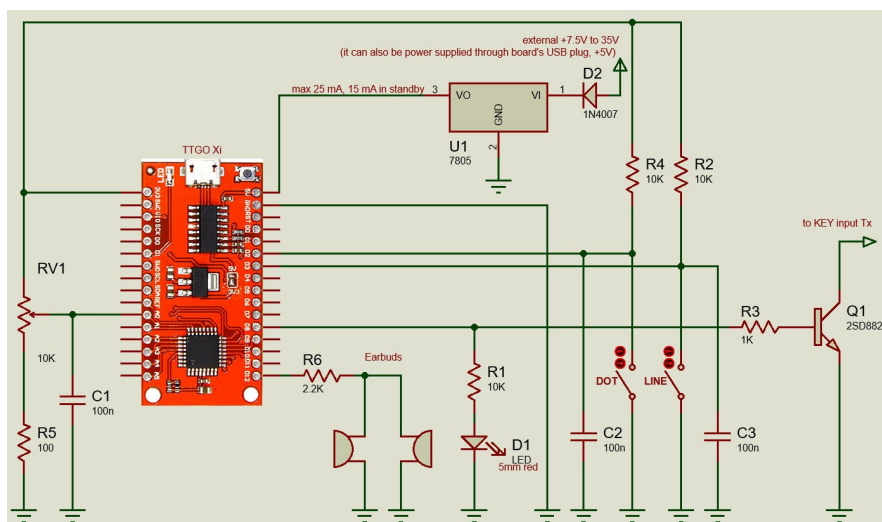


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threw at it, including a CW keyer initially designed by PA3HCM for an Arduino UNO board:

<http://www.pa3hcm.nl/?p=1010>

The keyer works directly with the schematic and sketch by PA3HCM for Arduino UNO, but in order to make it usable in every day ham radio activity, it required small hardware and software changes to take into account that this board works at 3.3V instead of 5V and that it does not have D13 pin.

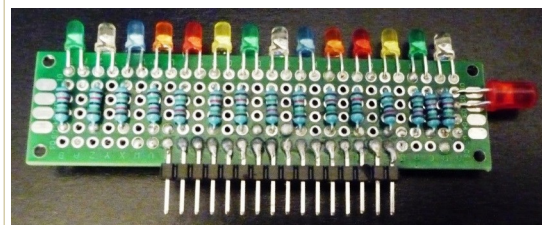


The schematic [top]; the breadboard version [bottom left]; and the shield (accessory board) I made for it [bottom right].

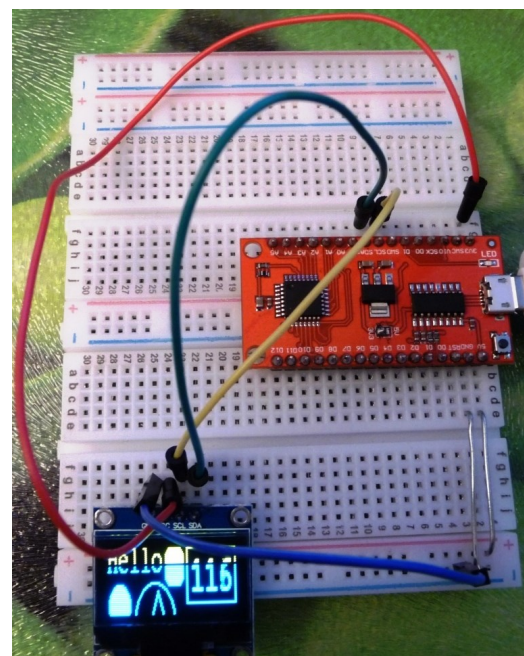
It can be seen functioning on YouTube: <https://www.youtube.com/watch?v=3kxGeq5H0S0&t=5s>

You can see my “shield” (accessory board) in operation at: <https://www.youtube.com/watch?v=cFADTW8faSA>

I tested other sketches initially designed for Arduino boards. I even made a special shield for following what happens at the digital output pins.



I was able to put into operation I2C communication. It runs a demo program for a 4 pins OLED display. This board uses separate dedicated pins for SCL and SDA, different than Arduino Nano board which uses A4 and A5 pins.



The table on the next page shows a summary comparison of a TTGO Xi board (Ocrobot Alpha 8F328P-U board) with similar Arduino boards.

~ 73, Daniel VE7LCC



	ALPHA 8F328P-U	Arduino Nano	Arduino Pro Mini
USB interface	Have	Have	no
ADC accuracy	12bit	10bit	10bit
DAC output	Have	no	no
Internal reference accuracy	±0.5%	±1.5%	±1.5%
PWM dead zone control	Have	no	no
High current push-pull PWM	Have	no	no
Highest frequency	32M	16M	16M
Operational Accelerator (DSC)	Have	no	no
Stack extension system	Have	no	no

[Left] Table showing a summary comparison of a TTGO Xi board (Ocrobot Alpha 8F328P-U board) with similar Arduino boards

A video on The Hidden Meaning of Ham Radio Jargon: a ten-minute, entertaining lecture on "hamspeak" that you can use to impress (or fool) your friends:

[https://www.youtube.com/watch?v=dA2N367qt\\_A&feature=youtu.be](https://www.youtube.com/watch?v=dA2N367qt_A&feature=youtu.be)



## More On The CTCSS Generator From February 2018

In The Communicator [February 2018, page 48] I proposed as a possible CTCSS generator for older transceivers a \$2.25 CAD Chinese 3-digit generator (double generator - 2 on the same board, with only one display for both, switchable, and with separate outputs). Through experiments I illustrated that, with a precise generator, repeaters requiring a PL tone, for example 88.5 Hz, will work just fine with 88 Hz, and so on. I did not receive the \$2.25 CAD Chinese card before writing that article, so it was presented as a possible solution, not as a confirmed solution.

In the meantime I have received the card and YES, the proposed \$2.25 CAD solution works. I made the output of the generator(s) variable by putting a 1 KΩ

potentiometer in series with a 10 KΩ resistor. (The output of the card is 5 V, and I need somewhere around 10 mV - 200 mV).

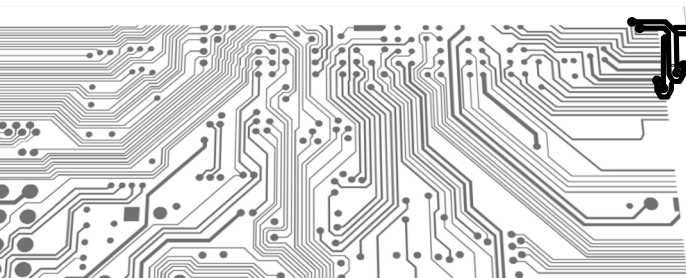
Maybe this inexpensive solution is useful for someone, maybe even for radio clubs.

Note: Aliexpress.com does not ship free to Canada currently. Whenever a product on their site is declared as having free shipping, it does not actually have free shipping if the destination country is Canada because they no longer use Canada Post during the current labour dispute.

~ Daniel VE7LGG



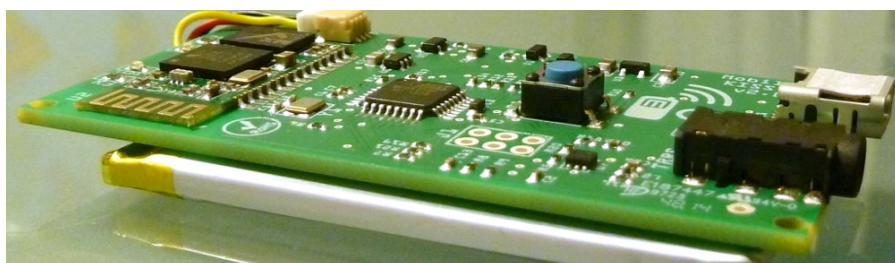
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# TECH TOPICS

Rob Riggs WX90

## The Arduino KISS TNC



*Just so you know, I hope to release an updated version in the next few months that is similar to the TNC3 we will be releasing next month. It is a little more complicated, but it works better for general packet radio. Overall build cost should be around USD20-25. It will use an STM NUCLEO-L432KC board instead of an Arduino Nano.*

### Create a Mobilinkd TNC on a breadboard

The Mobilinkd TNC1 started its life, as with many things these days, as an Arduino project. It quickly took on a life of its own, first gaining Bluetooth capabilities when I discovered the latent abilities of APRSdroid. And then gaining a battery and recharging circuitry before finally ending up as a product that could be mass-produced.

But underneath it all is still the Arduino project that it started out as. With a few minor tweaks to the firmware to remove the Bluetooth and battery bits, the same firmware that runs in the Mobilinkd TNC1 will run on an Arduino.

The TNC doesn't use Bluetooth, so you cannot use it with APRSdroid, but you can use other packet and APRS software on your computer over the Arduino's USB serial port.

3. 10KOhm Resistor (Qty 3)
4. 100KOhm Resistor
5. 1KOhm Resistor
6. 2.2KOhm Resistor (maybe)
7. 10nF Capacitor
8. 100nF Capacitor
9. NPN Transistor (PN2222 or equivalent)
10. 3.5mm 4-pole jack (SparkFun BOB-11570 - \$4)
11. TNC cable for your radio (~\$10; Mobilinkd)
12. 3.5mm 4-pole extension cable (optional but recommended - \$7; Amazon)

The resistors, capacitors and transistor cost just a few cents in total if you have them lying around. Otherwise you can find a various starter kits that include the breadboard and a set of electronic components for around \$20.

You can skip the 4-pole connector and wire a cable directly into the board if you want to save yourself a few bucks.

You will also need a computer (Linux, Windows or OS X) and a mini-USB cable to load the Mobilinkd firmware onto the Arduino and to run the APRS or packet software.

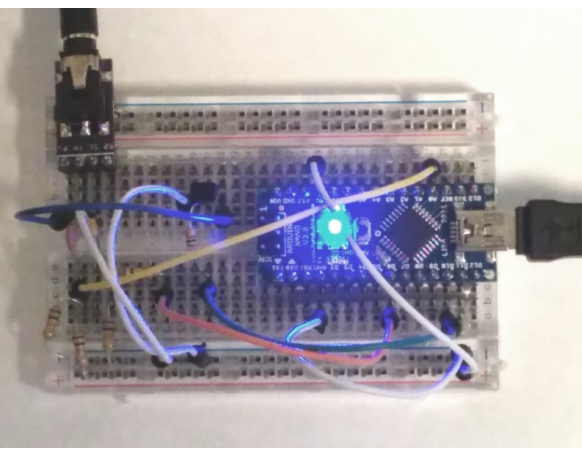
### Shopping List

Here are the things you will need for this project:

1. Small Breadboard (IB401 w/Jumper Wires - \$5; Amazon)
2. Arduino Nano v3 (Generic Arduino Nano v3.0 - \$12; Amazon)

### Getting Started

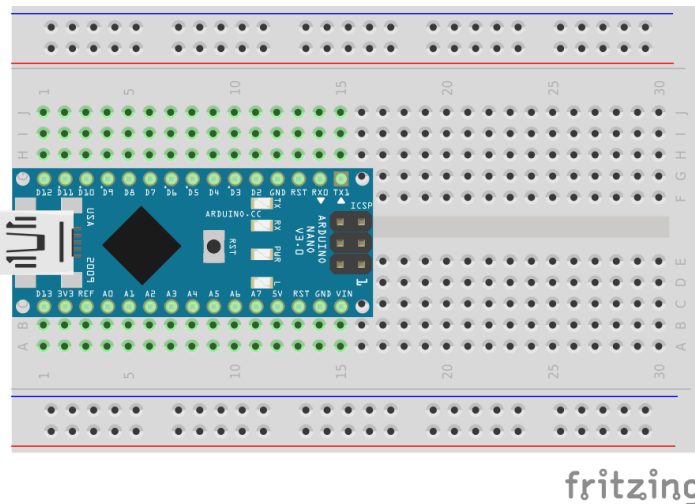
Take a look at the breadboard. The pin rows are numbered from 1 to 30. And the pin columns in the middle are labelled "a" through "j". There are power rails along either edge. We will only be using the power rail closest to the "j" column



for this project (the top two rows, red and blue, in the diagrams below.)

### ARDUINO

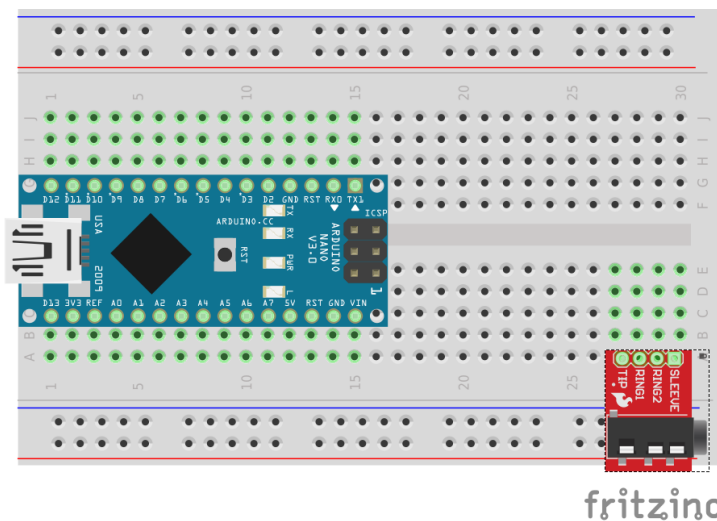
Plug the Arduino Nano into one end of the board. The Arduino pins should start at row 1.



### 3.5MM CONNECTOR

Plug the 3.5mm connector into the other end, in column "a", pins 27-30. The SparkFun connector will facing out the rear of the breadboard.

(The pinout on the SparkFun connector is different than the TRRS connector that I used in the picture at the top of this article. Some of the parts in this tutorial will be in different places on the board than what is shown there.)



(Big shout out to Rick Waldron for the BOB-11570 connector component for Fritzing.)

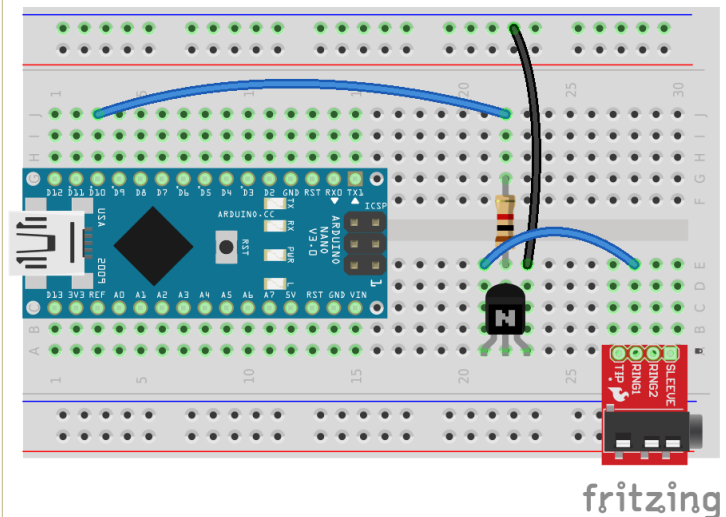
- Just note the following:
- Sleeve is ground.
- Ring2 is audio out (TX)
- Ring1 is PTT
- Tip is audio in (RX)

### PTT CIRCUITRY

Plug the transistor into column "a", rows 21-23. The flat part of the transistor is facing the nearest rail.

- Emitter in a:21
- Base in a:22
- Collector in a:23

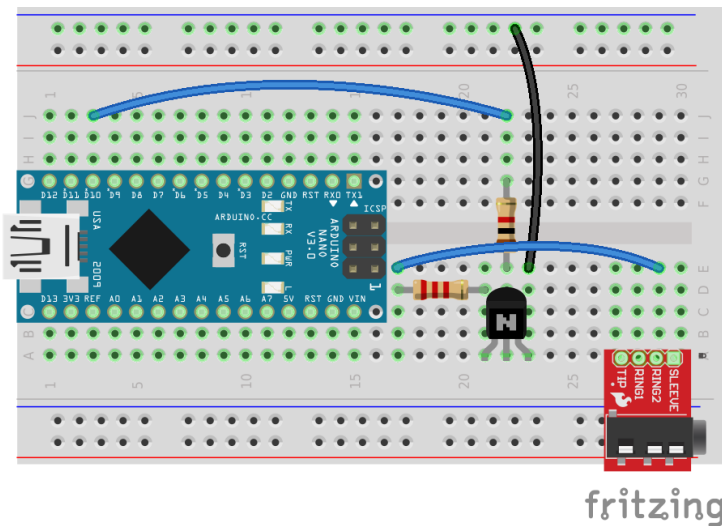
Run a wire from e:23 (Collector) to the negative rail (Ground). Plug one end of the the 1KOhm resistor into e:22 (Base) and the other into g:22. Run a wire from j:22 to j:3 (Arduino D10) . And then run a wire from e:21 to e:28 (3.5mm Ring 1).



### PTT (ALTERNATE)

If your radio does not use a separate PTT signal, you will need one additional component. You will need 2.2KOhm resistor. Instead of a wire from e:21 to e:28, you will need to plug the 2.2KOhm resistor from d:21 to d:17, and then run the wire from e:17 to e:29. This multiplexes the PTT signal on the audio output line. If you are using this with an Icom, Yaesu or Alinco HT, this is likely what you need.

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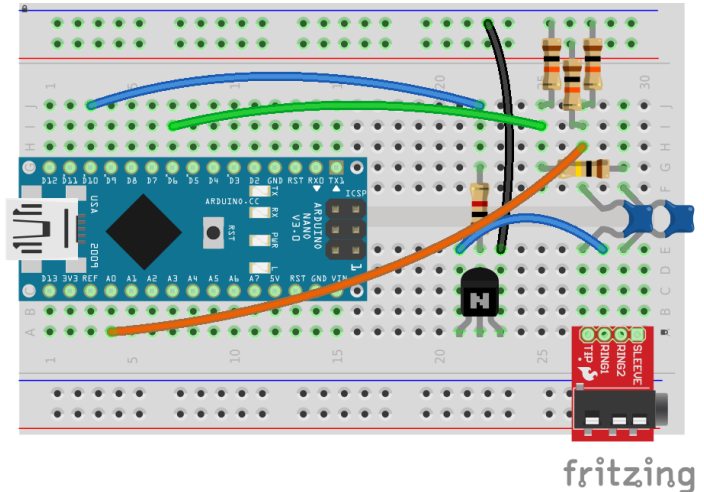


### AUDIO OUTPUT

The TNC generates audio using PWM (pulse-width modulation). This is filtered by the radio's audio circuitry into a nice smooth audio waveform.

Plug the 100nF capacitor into e:29 (3.5mm Ring 2) and f:29, jumping the middle of the board. Plug the 100kOhm resistor from g:29 to g:25. Connect a 10kOhm resistor from j:25 to the negative rail (Ground). Then run a wire from i:25 to i:7 (Arduino D6).

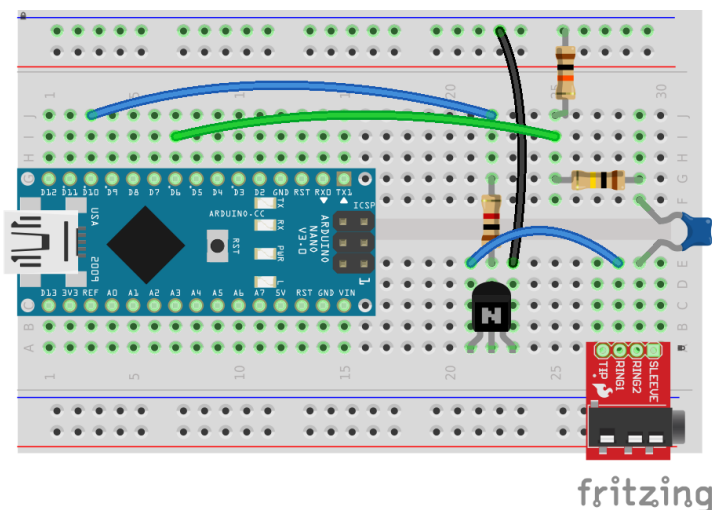
jumping the middle of the board as we did with the audio output. With the remaining two resistors, plug one into j:27 and the negative rail (Ground), and the other into i:27 and the positive rail (5V). Be careful not to short the resistors. Run a wire from h:27 to a:4 (Arduino A0).



In case you are wondering, the pair of resistors are there to add a 2.5V DC offset to the audio signal. This is needed because the audio signal comes in at about +/- 1V. The ADC on the Arduino can only handle input voltages between 0-5V. With the offset, we get an audio signal that varies from 1.5-3.5V.

### POWER & GROUND

Run a wire into a:12 (Arduino 5V) into the positive rail (5V). Run a wire from i:12 (Arduino GND) to the negative rail (Ground) and from a:14 (Arduino GND) to the negative rail. It is always a good idea to tie all of the ground connectors to the ground rail. Finally, run a wire from e:30 to the negative rail. This ties the 3.5mm connector's sleeve to ground.

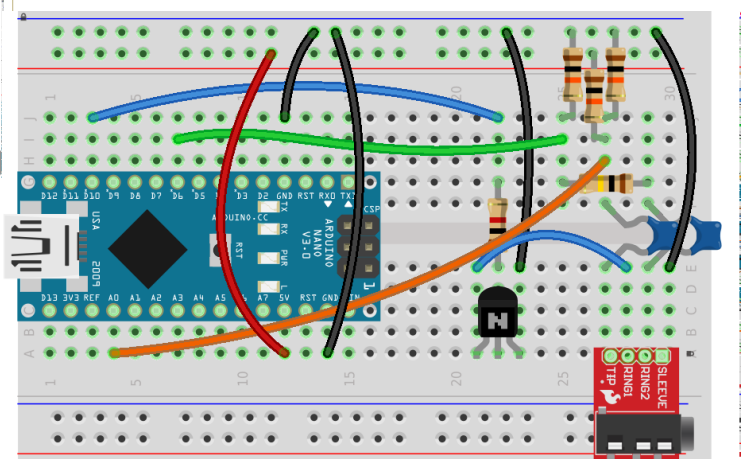


The two resistors form a voltage divider that takes the 0-5V audio output and reduces that to 0-500mV.

### AUDIO INPUT

The TNC uses the ADC on the Arduino to capture the audio input, which is then decoded.

Plug the 10nF capacitor into e:27 (3.5mm Tip) and f:27,





## CHECKOUT

That's it for the hardware! Go through the instructions one more time. Make sure the wiring matches and that there are no shorts (easy to do with the bare wires on the discrete components). If everything looks OK, we are ready to proceed to uploading the TNC firmware.

## Firmware Installation

For this you will need a program called "avrdude" and the firmware from the Mobilinkd GitHub site. These instructions are going to assume that the firmware is being installed from a Linux host, but the process is very similar on Windows and Apple OS X. The major difference is that "avrdude" is available as an easily installed component of most Linux distributions. Getting and installing avrdude for Windows or OS X is a little more involved.

Download the firmware from the GitHub site.

<https://raw.githubusercontent.com/mobilinkd/tnc1/arduino/images/mobilinkd-473-arduino.hex>

You should have a file called "mobilinkd-473-arduino.hex".

Plug the mini-USB cable from your computer to the Arduino. Find the USB serial port being used. It will typically be /dev/ttyUSB0. On my computer it is /dev/ttyUSB1 because another USB device is plugged in.

Run the following command to upload the firmware:

```
avrdude -c arduino -p m328p -P
/dev/ttyUSB1 -b 57600 -U mobilinkd-
473-arduino.hex
```

You should see the TX/RX LEDs flash for a bit as the firmware is uploaded, and you are done.

You now have a fully functional KISS TNC with a USB serial port. It has PTT signaling that, depending on how the circuit is configured, will work for just about any radio.

Leave the cable plugged into the TNC because this is how your computer will be communicating with the TNC.

## Connect Your Radio

Before plugging in your radio, please be careful with RF around computers and in your shack. The wires on the breadboard and the leads on the components are all small antennas. It is best if you have an external antenna, keeping the RF well away from your work area. Or you can use a dummy load while testing. If you have neither of those things, please at least set your radio to low power.

Plug the extension cable into the 3.5mm jack on the breadboard. Plug your TNC cable into your radio, making sure it has a ferrite bead on it. Then plug the TNC cable into the extension cable.

## Running APRS Software

The last step of the process is to run APRS software on your computer. That is a bit outside the scope of what I had intended for this article. Xastir is an easy-to-use GUI app on Linux. Just set your software to connect to a KISS TNC on the same COM port that you used when you uploaded the firmware. Set the serial port to 38400, 8N1.

If you are on Windows or Linux, you should be able to use the Mobilinkd TNC configuration programs to adjust the TX volume and monitor the RX volume, as well as set the various KISS parameters.

~ Rob Riggs WX9O  
Mobilinkd LLC

Reprinted with permission.

And here is a video on a different application of the technology: Winlink Email over HF/VHF using the Mobilinkd Bluetooth TNC:

<https://www.youtube.com/watch?v=gJMCloSt5nY&feature=youtu.be>

*Mobilinkd LLC makes the best portable digital communication devices for the amateur radio enthusiast. Our devices are easy to use and highly portable. We make inexpensive, open, and easy to use packet radio products that integrate seamlessly with modern mobile platforms. Our hardware and software are completely open and we encourage our customers to hack on the board and the software.*

*Started in June 2013 by Rob (WX9O) and Janice Riggs and based in Chicago, Illinois, it grew out of a small project that started with a few innocuous holiday gifts: a soldering iron, an Arduino and a multimeter.*

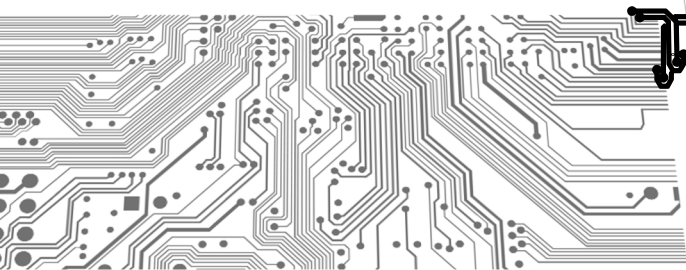
*Lots of long nights and a lot of encouragement from fellow Hams resulted in a workable TNC. Many more hours were put in to make it a product that was not just usable by others, but that would be a joy to use by others. We hope you enjoy your Mobilinkd TNC.*

*We stand behind our products. If you are ever not satisfied, return the TNC for a full refund.*

*To contact us, please send email to [mobilinkd@gmail.com](mailto:mobilinkd@gmail.com)*

*<https://store.mobilinkd.com>*

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# TECH TOPICS

Rob Riggs WX90

## Another Take: The Arduino KISS TNC

This week's project was to try and flash some new firmware into one of my generic Arduino boards. The [KISS TNC firmware](#) from Mobilinkd caught my eye as it looked like a cheap and easy way to get onto APRS (or plain old AX25 Packet) without finding an old Tiny-2 TNC, using a soundcard modem or buying a [TNC-X](#).

In order to get the TNC firmware onto the 'duino board, you'll need to use [AVRDude](#) to "flash" the device. Once you've installed AVRDude, open a command-box (Start>Run then type cmd) and enter the following which should re-flash your 'duino board with the TNC firmware. If your 'duino board is on a different COM port, you will need to change that to match yours. If you want to get your normal Arduino firmware back - use the IDE to re-flash the firmware.

```
avrdude -c arduino -p
m328p -P COM12 -b
115200 -U kisstnc.hex
```

If you prefer using a GUI, [XLoader](#) is probably an easier way to load the HEX file.

The components required are minimal - just some filtering and a voltage divider plus an NPN transistor (2N2222, BC108 etc) to handle the PTT. Obviously you'll need to apply power to your 'duino using the USB jack which also

functions as the virtual COM port which AGW communicates with.

You can use whatever 'duino variant you have available - an Uno has been tested here but a Nano would be good for a really tiny boxed solution. It's really up to you! A quick video can be viewed here - sorry for the poor lighting, but you can make out the AX25 tones being generated in response to a "beacon" from the AGW Packet Engine.

A pre-flashed Arduino is available here: [https://www.hamgoodies.co.uk/index.php?\\_route\\_=arduino-kiss-tnc](https://www.hamgoodies.co.uk/index.php?_route_=arduino-kiss-tnc) for £12.

~ MOPZT

### KK6FUT's Demonstration

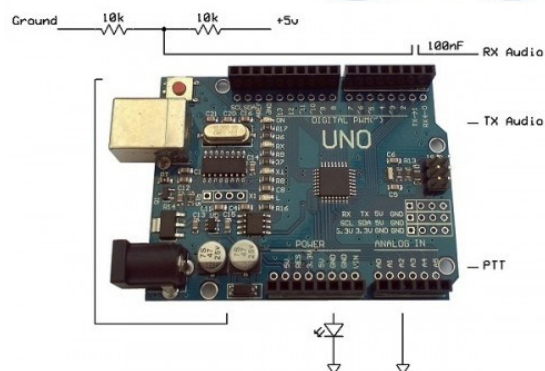
Here's a new project: an Arduino-based, Terminal Node Controller (TNC), for packet radio. In my case, I'm using this for APRS. This Arduino, and some software written by KI4MCW to decode FSK (using a Fast Fourier Transform, can send and receive packets, all for about \$5 in parts, in a tiny space, compared with traditional, large TNC equipment. This is connected to a Baofeng UV5R and using Windows to view the packets. More details on how to build this from M1GEO here: <https://www.george-smart.co.uk/wiki/A...>

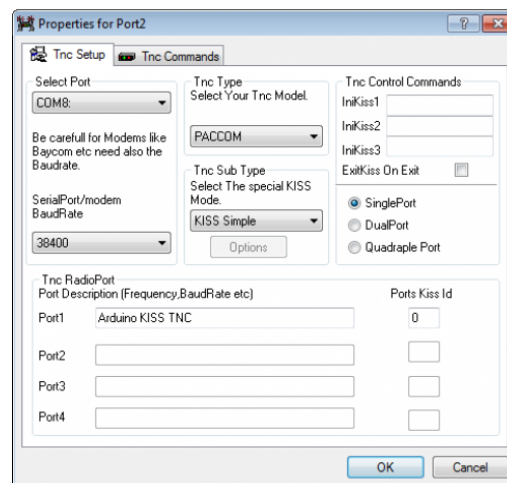
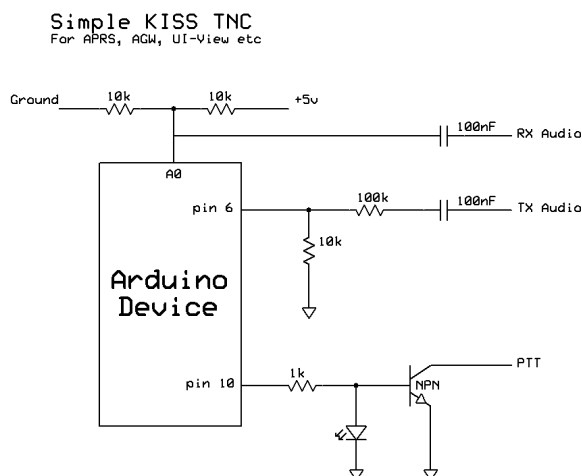
YouTube demo at: <https://www.youtube.com/watch?v=SJd1pkU8Huc>

The original source code and project for the Arduino APRS TNC here from KI4MCW: [https://sites.google.com/site/ki4mcw/...](https://sites.google.com/site/ki4mcw/)

### Simple KISS TNC

For APRS, AGW, UI-View etc





### Notes From Another Arduino AX.25 TNC Project

I have been interested in APRS for years, and have been running a homebrew APRS Tracker in the car for a good few years too, as well as MB7UCL and various other bits and pieces on the APRS network.

Some years back, I messed around with a PIC micro-controller based TNC which worked with limited success using an old MX614 modem chip. The project never made it onto the website. This time around, I'm using Arduino boards and using the ADC on the MCU to do the demodulation of the AFSK signal to decode the AX.25 and therefore the APRS.

There are several works already doing this, and this only details some of my attempts to get the code working. Very little is my own work, it's mostly just trying the work of other hams (and much better programmers). Existing works on this area include:

- [Arduino TNC - KI4MCW](#) (Soft modem)
- [The WhereAVR - N4TXI](#) (Soft modem)
- [Airgate - DL8RDS](#) (Soft modem)
- [Arduino APRS - BeRTOS](#) (Soft modem)
- [AX.25 Packet Modem on Arduino - VE6SLP](#) (Soft modem)
- [Building an Open Source Arduino APRS Tracker with LCD & GPS \( SVTrackR \) - 9W2SVT](#) (Soft modem)
- [extdigi, an APRS Digipeater for Arduino - LU4EXT](#) (Soft modem)
- [Adafruit APRS Shield](#)
- [Trackuino - An Arduino APRS tracker](#)

~ George Smart M1GEO  
<https://www.george-smart.co.uk/>



### Social Reminders

The Surrey weekly social gathering is on Saturday at the Kalmar Restaurant at 80th and King George Boulevard between 8 and 10:00 am. You don't have to be a SARC member to participate. Bring your significant other, bring your family, see old friends and have fun.



January 2019

## The Contest Contender

John Brodie VA7XB

### RAC Winter Contest



I'm gratified that we seem to be attracting an ever-growing number of members who enjoy contesting and will come out to show the SARC flag at these events. No, many of us are not in the "ace" category, but simply see contests as an opportunity to improve our operating skills by practicing and learning from those who are more proficient.

Our ultimate goal is to have two and possibly three, high power stations at the OTC able to operate simultaneously but, for now, we are limited to one high power station. In a couple of months we should have our high power triplexers and bandpass filters constructed and ready to expand multi-station capability.

Our most recent contest was the RAC Winter Contest held on Dec 28/29. The SARC team was comprised of Les VA7OM, Slawa VE7LWW and John VA7XB on CW, with Kapila VE7KGK and John VE7TI on SSB operating as Multi-Single-High Power. Conditions were poor at times, but still the group managed 903

contacts for a claimed score of ~164,000. As usual under current conditions, all the action was on 20, 40 and 80 m.

What contests are coming up in January?

- ARRL RTTY Roundup on Jan. 5-6
- North American QSO Party (CW) on Jan. 12-13
- North American QSO Party (SSB) on Jan. 19-20
- BARTG RTTY Sprint on Jan. 26-27.

One or two of these will be official VE7SAR events, but the remainder (and others which you can find on

<https://www.contestcalendar.com/contests.html>) are open to members using their own callsign. Just let one of the Executive know if you wish to participate and we will assist you with the setup.

One more important reminder: mark Feb. 2-3 on your calendar for the BC QSO Party.

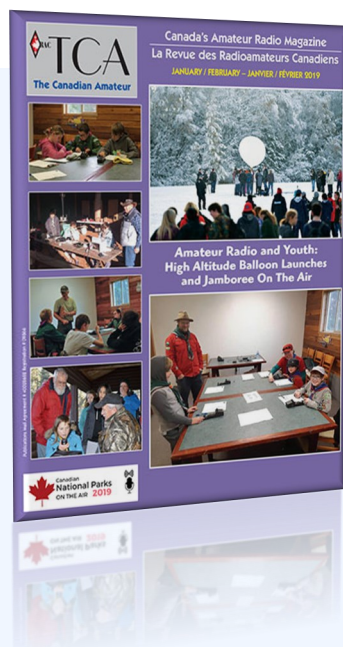
~ John VA7XB



Operator	3.5	7	14	Tot	Accum
VA7OM	0	0	230	230	230
VA7XB	1	55	32	88	318
VE7KGK	0	0	127	127	445
VE7LWW	207	116	0	323	768
VE7TI	0	96	39	135	903
Total	208	267	428	903	903



As an aside, SARC President Stan Williams was operating CW with the VE7RAC callsign at VE7IO. Two radios were engaged on HF and there was no option for Stan on HF so he went to 2m and made a simplex contact. The interesting part is that Stan is a dedicated CW operator. I think this was the first time we have seen him with a mic in hand! See the video at: <https://tinyurl.com/va7nf-mic> The resulting @VE7SAR Twitter post received over 1,200 views and over 40 'likes' and re-tweets.



The Radio Amateurs of Canada (RAC) magazine 'The Canadian Amateur' (TCA) January-February issue is now available to members on-line. This issue contains an article on our JOTA efforts in October.

For membership information, please visit: [wp.rac.ca](http://wp.rac.ca)



January 2019



## KB6NU's Column

Dan Romanchik, KB6NU

### ***Make Ham Radio A Habit***

Every week, I get an email newsletter from Penguin Random House called Signature. Signature includes links to articles about books and writing. Being a writer, I clicked on the link to "5 Good Writing Habits You Need to Learn Now." As I was reading the article, it occurred to me that the advice could also apply to amateur radio.

So, with apologies to the author, Lorraine Berry, here are five things you can do to make ham radio a habit:

1. **To get on the air more, or to do more building, set up a time to do it.** If you enjoy getting on the air or homebrewing, but never seem to be able to find the time to do it, you need to put it on your schedule. Set aside the time a couple of days, or a week, or even a month in advance, and you'll be more likely to do it. If you set up a regular time every week, pretty soon it will be a habit.
2. **If ham radio is important to you, create an environment that encourages you to do ham radio.** To make ham radio a habit, you really need a place that's set up to do ham radio. If you have to dig out and set up your equipment every time that you want to get on the air, you're just not

going to do it. You need a "shack" that makes it easier for you to engage in the hobby. Richards, K8JHR, gave me some great advice back in 2012 on where and how to set up a shack

(<https://www.kb6nu.com/building-a-new-shack/>).

3. **Create temptations that reward you for your new habit of ham radio.** For me, being able to make interesting contacts, or building some new gizmo, is reward enough, but you may want to reward yourself with a beer or some ice cream after an operating session.
4. **Make it easy to do what you like to do.** This is related to #4. Your shack should have everything you need to easily do whatever ham radio activities you enjoy doing. If you enjoy operating, then it should have a nice operating desk. If you enjoy building, then set it up so that all of your tools are readily accessible. The easier it is to do, the more likely it is that you'll do it. If you enjoy operating portable, then build up a kit that has all the stuff you need, and have it ready to go when you're ready to go.
5. **Start with the Two-Minute Rule for new habits and continue from there.** The "two minute rule" (<https://www.lifehack.org/articles/productivity/how-stop-procrastinating->

*When he's not trying to figure out which way current flows, Dan blogs about amateur radio at [KB6NU.com](http://KB6NU.com), teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at [cwgeek@kb6nu.com](mailto:cwgeek@kb6nu.com).*



[and-stick-good-habits-using-the-2-minute-rule.html](#)) is a tool to help you overcome procrastination. The idea is to allot just two minutes to a task that you'd like to complete or a skill that you'd like to develop. It's a small commitment, but enough to get you started, and the idea is that once you're started on a particular task or project, continuing work on that task or project becomes a lot easier. Those two minutes could easily become a half hour or an hour once you've gotten the ball rolling.



Armed with this advice, I'm expecting you to be a more active ham in 2019. I'll be listening for you on 40 m.

~ Dan KB6NU



## RAC Winter Contest

### Radio Amateurs of Canada

As you all know, I'm a very casual contester. Well, last night, I got sucked into the [RAC Winter Contest](#). It was a blast. I made 64 contacts in about an hour and 20 minutes and spent a bit of time actually "running" a frequency. The key, of course, is that you can make contacts with anyone, anywhere in this contest.

One thing that occurred to me while I was letting the N1MM contest logging software call CQ is that I probably could do SO2R (single operator, two radios) operation with a little practice. I could see where I could spend the time spent calling CQ on one band making a contact on the other. That might be something to play around with on Field Day, but maybe the rules don't allow SO2R on Field Day.

~ Dan KB6NU

## DARS Advanced Course

The Delta Amateur Radio Society Advanced Amateur Radio Course has been finalized and registration is now open.

The course will be held over 6 Saturdays starting on February 16 and ending on March 23. Classes will be held over the full day, starting at 9:00 am and expect to end by 4:00 pm.

The exam is currently scheduled at 7:00 pm on Thursday, March 28. We will also meet one evening prior to the start of the course to distribute materials and discuss expectations.

North Delta Public Safety Building  
11375 84 Avenue  
Delta, BC V4C 2L9

The class size is limited to a maximum of 25 students.

### Prerequisite

An amateur radio operator certificate with at least a Basic Qualification is required before taking the advanced qualification for amateur radio.

The registration fee for attending the Advanced Amateur Radio Course is \$100 and includes the cost of textbooks, online copies of the slides, online quizzes, refreshments and the final examination. Instructors volunteer their time for the hobby we all love.

Further details are available on our website or register by completing the form.

Chris S (VE7XH/VE7QCS)  
Secretary/Treasurer  
Delta ARS

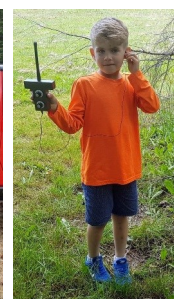
January 2019



## A Look Back...

### SARC's 2018 Year In Pictures

*We've been busy!*





# QRT

John Brodie VA7XB

## **A Preview: What is Planned for 2019?**

January is a good time to starting thinking ahead to activities for the coming year. We are blessed to have an active and growing membership but need to keep focused on what makes us successful as an organization and keeps members' interest. Perhaps a preview will inspire inactive members to become more involved and, even better, offer to participate in the initiation, planning or implementation of a specific activity.

### **All Year – Monthly General Meetings**

SARC endeavours to offer primarily technical presentations at its monthly meetings. Because our membership is comprised of the complete range of know-how varying from novices to 60 year veterans, It is always a challenge to find topics that will interest everyone. What we need are more suggestions of interesting topics and speakers and, especially, volunteers willing to share their expertise by giving talks.

### **All Year – Public Service**

SARC has always been involved in public service by providing radio communications at parades, car shows, bikeathons, marathons and other community events. However, its growing importance is such that in 2019 a new sub-group of SARC will come into existence, headed by Don Hamilton VA7GL. A formal relationship between the Public Service Group, the City of Surrey and SEPAR will be defined to integrate the services provided and ensure maximum benefit to the

community at a local and regional level and beyond. A 4-person Executive committee is at work to describe this relationship and secure buy-in from stake-holders.

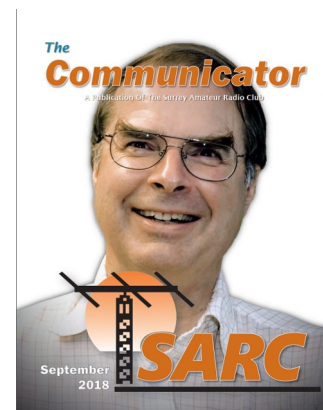
### **May – Foxhunt**

(aka Radio Direction Finding - RDF).

SARC was the first club in the Lower Mainland to sponsor an annual foxhunt, held traditionally in early May at Crescent Park in South Surrey. Since then other clubs have begun staging events of their own. SARC's foxhunt organizer, Anton James VE7SSD, has had lots of welcome help, particularly from members of BC Radiosport like Amel Krdzalic VA7KBA who has taken the lead in promoting RDF in this area. What started out as a VHF activity has recently evolved to 80m, based on the availability of specialized equipment conceived and made available by Les Tocko VA7OM. In a future Communicator, you will find a description of plans for the next generation of 80m receivers .

### **June – Surrey Doors Open**

For 2 years in a row, SARC has hosted this event at the OTC. With a solid history of success behind us, John Schouten VE7TI has applied again this year. Doors Open represents an opportunity to showcase amateur radio to the community and to demonstrate how the OTC is evolving into a training, emergency and public service venue to supplement other facilities provided by the City of Surrey.





January 2019

## SARC SOCIETY DIRECTORS 2017-2018

### PRESIDENT

Stan Williams VA7NF  
[president @ ve7sar.net](mailto:president@ve7sar.net)

### VICE PRESIDENT

John Brodie VA7XB  
[vicepresident @ ve7sar.net](mailto:vicepresident@ve7sar.net)

### SECRETARY

Jeremy Morse VE7TMY  
[secretary @ ve7sar.net](mailto:secretary@ve7sar.net)

### TREASURER

Scott Hawrelak VE7HA  
[treasurer @ ve7sar.net](mailto:treasurer@ve7sar.net)

### DIRECTORS

John Schouten VE7TI  
(Communicator, Blog Editor  
& SEPAR Liaison)  
[communicator @ ve7sar.net](mailto:communicator@ve7sar.net)

Robert Fishwick VA7FMR  
(Net Manager)

Anton James VE76SSD

Michael Birtles VE7GMP

### MEMBERSHIP

John Brodie VA7XB  
[membership @ ve7sar.net](mailto:membership@ve7sar.net)

### CONTEST MANAGER

John Brodie VA7XB  
[vicepresident @ ve7sar.net](mailto:vicepresident@ve7sar.net)

### SARC QSL MANAGER

Heinz Buhrig VA7AQ  
15684 102 Avenue  
Surrey, BC V4N 2G4

### SARC REPEATER MANAGER

[repeater @ ve7sar.net](mailto:repeater@ve7sar.net)

(Continued from page 51)



### June – Field Day

Everyone knows what Field Day is all about - it is a demonstration of our readiness for an emergency requiring radio communication by participation in what is in reality a North America wide competition. For our 2018 event, SARC again placed first in Canada in the 3A category (3 transmitters + portable power). Sheldon Ward VA7XNL was responsible for coordinating this event in 2018. Planning, which begins in January, needs the involvement of a wide spectrum of members, each of whom can contribute their time and specialized talents. A Field Day Coordinator will again be sought early in 2019 to lead the FD committee to another successful event and show the public, politicians and civic agencies that we are deadly serious about our commitment to be prepared.

### October – Jamboree on the Air (JOTA)

JOTA has been actively supported by SARC and SEPAR for several years, with 2018 the most successful yet. Organized by leaders of Scouts Canada and a representative of SARC (John Schouten VE7TI in past years and John Brodie VA7XB in 2018), this year's event featured interactive emergency response, VHF/UHF communication locally as well as worldwide over IRLP and Echolink, HF communication, introduction to CW and phonetic

alphabet, and Radio Direction Finding. The Langley (LARA) and Coquitlam (EPCOM) amateur radio organizations contributed in significant ways to this regional event held at Camp McLean in Langley.

We see this as an ideal opportunity to plant the seed of interest with motivated youth who may wish to pursue amateur radio.

### Contests – all Year

Contests are a fun way to confirm equipment functionality and operator proficiency by subjecting participants to a competitive environment that mimics an emergency situation, where crowded band conditions and poor propagation are the norm. SARC generally sponsors at least one contest a month in the different modes (CW, SSB or digital). This is the single most effective way to ensure that our equipment, and each of us personally, are ready for the big emergency, where there will be no time to train. If you want to join the contesting group but have never done contesting, let one of your Executive know.

### Spring and Fall

#### – Basic Licensing Class

One of the best recruitment tools for both SARC and SEPAR is the basic licensing class, held twice a year at Surrey's Central Training Facility. Typically, 20-40 students a year graduate and receive their amateur radio license. Instructors are John Schouten VE7TI and Stan Williams VA7NF, with administrative assistance provided by Michael VE7GMP. Jason Biggin VA7ITJ will be joining the instruction team in 2019. The interests of students do not always align with those of SARC's or SEPAR's as some are off-roaders or boaters, but on average, 10% of the graduates will stay with our organizations and become active. Classes also bring in revenue for SARC. The next course commences on January 15th.

- John VA7XB



## It's January

Happy New Year and welcome to another year of great Amateur Radio activity with SARC. With your input we can tailor programs to fit all experience levels and all facets of our great hobby.

At our general meeting on Wednesday, January 9<sup>th</sup>, Kevin McQuiggin VE7ZD will follow up on the feature topic in this issue of The Communicator and will present a talk on Arduino, including an intro to the device, how it works with hardware, and the GUI.

Please join us, visitors always welcome.

**SARC** hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, also accessible on IRLP node 1736 and Echolink node 496228.

On UHF we operate a repeater on 443.775MHz (+5Mhz) Tone=110.9 or IRLP Node 1737.

	SARC Net 20:00 Hrs
1 <sup>st</sup> Tuesday Standby	Drew VA7DRW Dixie VA7DIX
2 <sup>nd</sup> Tuesday Standby	Jinty VA7JMR Sheldon VA7XNL
3 <sup>rd</sup> Tuesday Standby	Rob VE7CZV Vacant
4 <sup>th</sup> Tuesday Standby	Kapila VE7KGK John VA7XB
5 <sup>th</sup> Tuesday Standby	Robert VA7FMR John VE7TI
Want a turn at Net Control? Contact the SARC Net Manager	

## Down The Log...

### SARC Monthly Meetings

2<sup>nd</sup> Wed. (Sept-Jun)  
1900 hr at the PREOC  
Emergency Mgmt BC  
14292 Green Timbers  
Way, Surrey, BC

### Weekly SARC Breakfast

Saturday between 0800  
and 1000 hrs at the  
Kalmar Family Restaurant  
8076 King George Blvd.  
Surrey

### SARC Net

Tuesday at 2000 hr local  
on 147.360 MHz (+)  
Tone=110.9

### SEPARS Net

Tuesday at 1930 hr local  
on 147.360 MHz (+)  
Tone=110.9

### VE7RSC Repeaters

2m: 147.360MHz+  
Tone= 110.9Hz  
IRLP node 1736  
Echolink node 496228

1.2m: 223.960 Mhz -1.6  
Tone=110.9

70cm: 443.775MHz+  
Tone= 110.9Hz  
IRLP node 1737



### We Have A SARC Patch!

These are suitable for sewing on a jacket, cap or your jammies, so you can proudly display your support for SARC.

The price is \$4 each or three for \$10 and they can be picked up at a meeting or the weekly Koffee Klatch.

*We thank our sponsors  
for their support of  
SARC*

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